AX6C

Online Manual

DOC. NO. : AX6C-OL-E0010B

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Before You Start

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Although this Online Manual is optimized for screen viewing, it is still capable for hardcopy printing, you can print it by A4 paper size and set 2 pages per A4 sheet on your printer. To do so, choose **File > Page Setup** and follow the instruction of your printer driver.
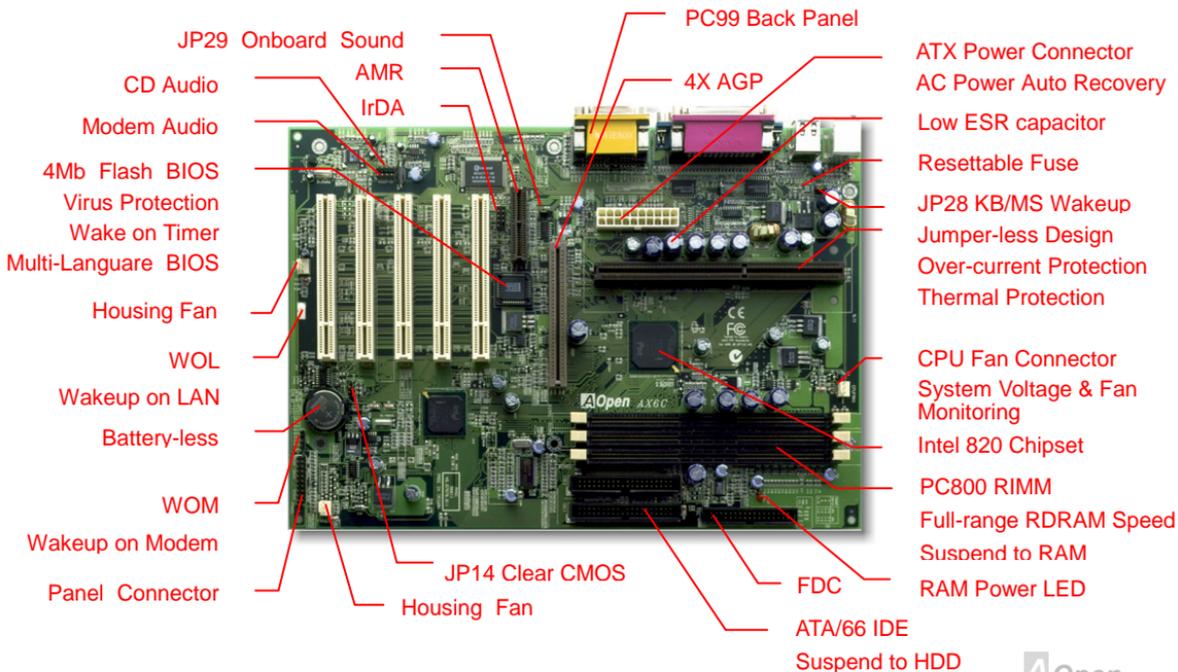
Thanks for the help of saving our earth.
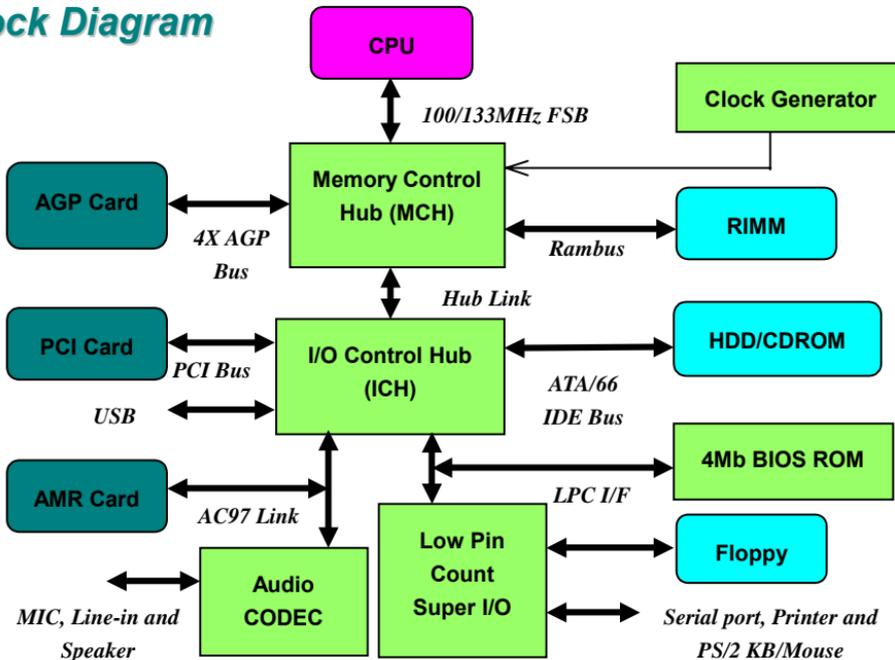
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Quick Installation Procedure

This page gives you a quick procedure on how to install your system. Follow each step accordingly.

1 Installing CPU and Fan

2 Installing System Memory (RIMM)

3 Connecting Front Panel Cable

4 Connecting IDE and Floppy Cable

5 Connecting ATX Power Cable

6 Connecting Back Panel Cable

7 Power-on and Load BIOS Setup Default

8 Setting CPU Frequency

9 Reboot

10 Installing Operating System (such as Windows 98)

11 Installing Driver and Utility

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Motherboard Map

PC99 Back Panel

JP29 Onboard Sound

AMR

CD Audio

IrDA

4X AGP

Modem Audio

ATX Power Connector
AC Power Auto Recovery

Low ESR capacitor

4Mb Flash BIOS
Virus Protection
Wake on Timer
Multi-Languare BIOS

Resettable Fuse

JP28 KB/MS Wakeup
Jumper-less Design
Over-current Protection
Thermal Protection

Housing Fan

WOL
Wakeup on LAN

Battery-less

CPU Fan Connector
System Voltage & Fan
Monitoring

Intel 820 Chipset

WOM
Wakeup on Modem

PC800 RIMM
Full-range RDRAM Speed
Suspend to RAM
RAM Power LED

Panel Connector

JP14 Clear CMOS

FDC

Housing Fan

ATA/66 IDE
Suspend to HDD

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Block Diagram

```
                          ┌──────────┐
                          │   CPU    │
                          └────┬─────┘                    ┌────────────────────┐
                               │ 100/133MHz FSB           │  Clock Generator   │
                          ┌────┴─────────┐                └─────────┬──────────┘
    ┌──────────┐          │ Memory Control│◄─────────────────────────
    │ AGP Card │◄────────►│   Hub (MCH)  │                ┌────────────────────┐
    └──────────┘          └──────┬───────┘◄──────────────►│       RIMM         │
         4X AGP                  │          Rambus        └────────────────────┘
          Bus                    │ Hub Link
    ┌──────────┐          ┌──────┴───────┐                ┌────────────────────┐
    │ PCI Card │◄────────►│ I/O Control  │◄──────────────►│    HDD/CDROM       │
    └──────────┘          │   Hub (ICH)  │                └────────────────────┘
       PCI Bus            │              │     ATA/66
       USB  ◄────────────►│              │     IDE Bus
                          └──┬────────┬──┘                ┌────────────────────┐
                             │        │◄────────────────►│   4Mb BIOS ROM     │
    ┌──────────┐             │        │      LPC I/F      └────────────────────┘
    │ AMR Card │◄────────────┘        │
    └──────────┘          ┌──────────┐│  ┌───────────┐   ┌────────────────────┐
         AC97 Link        │          ││  │  Low Pin  │◄─►│      Floppy        │
                          │  Audio   │└─►│   Count   │   └────────────────────┘
  MIC, Line-in and  ◄────►│  CODEC   │   │ Super I/O │
      Speaker             │          │   │           │◄─► Serial port, Printer and
                          └──────────┘   └───────────┘        PS/2 KB/Mouse
```

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Hardware

This chapter describes jumpers, connectors and hardware devices of this motherboard.

> *Note: Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components.   Always observe the following precautions before you install a system component.*
>
> *1.Do not remove a component from its protective packaging until you are ready to install it.*
>
> *2.Wear a wrist ground strap and attach it to a metal part of the system unit before handling a component.   If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.*

JP14 Clear CMOS

You can clear CMOS to restore system default setting. To clear the CMOS, follow the procedure below.

1. Turn off the system and unplug the AC power.

2. Remove ATX power cable from ATX power connector.

3. Locate JP14 and short pins 2-3 for a few seconds.

4. Return JP14 to its normal setting by shorting pins 1-2.

5. Connect ATX power cable back to ATX power connector.

Normal Operation (default)   **Clear CMOS**

Tip: When should I Clear CMOS?

1. Boot fail because of overclocking…

2. Forget password…

3. Troubleshooting…

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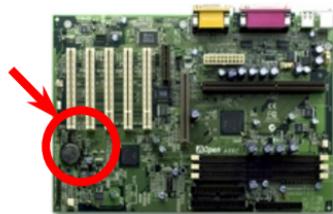
JP28 Keyboard/Mouse Wakeup

This jumper is used to enable or disable Keyboard/Mouse Wake Up function. If you select Enable, you can decide the wake up mode from BIOS Setup > Integrated Peripherals > Power On Function. To implement this function, the power supply 5V standby current must be greater than 800mA. Note that only PS/2 mouse supports Wake on Mouse function.

1 2 3

Disable

1 2 3
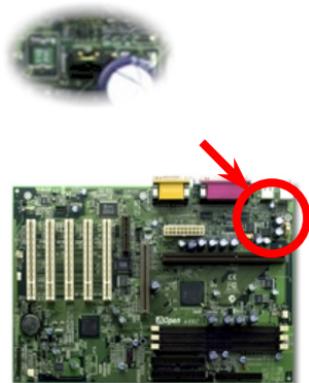
Enable

Tip: You have to wait for system to successfully boot from operation system (such as Windows or DOS) before the Wake-On-Keyboard/Mouse can take effect. This is because the information of how to support this function must be stored into Super I/O Controller and then you can use it for next power on.

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ATX standby power
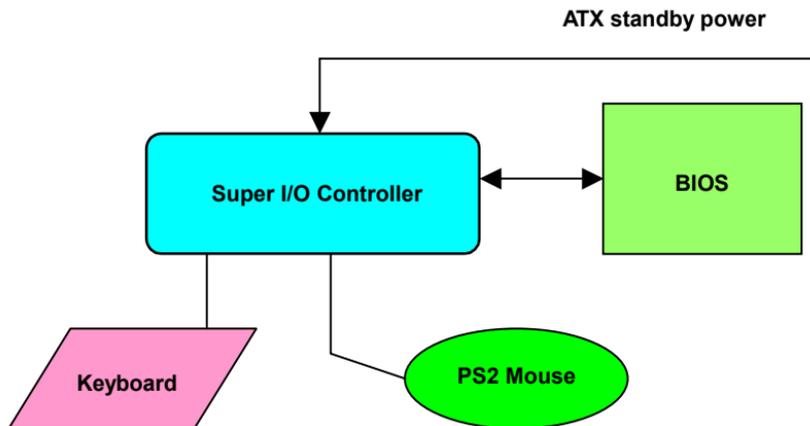
CPU Slot and Fan Connector

Plug CPU to slot1 connector. Be careful of CPU orientation.   Plug in the fan cable to the 3-pin **CPUFAN** or **FAN** connector.

GND
+12V
SENSE

Note: Some CPU fans do not have sense pin, so that cannot support fan monitoring.
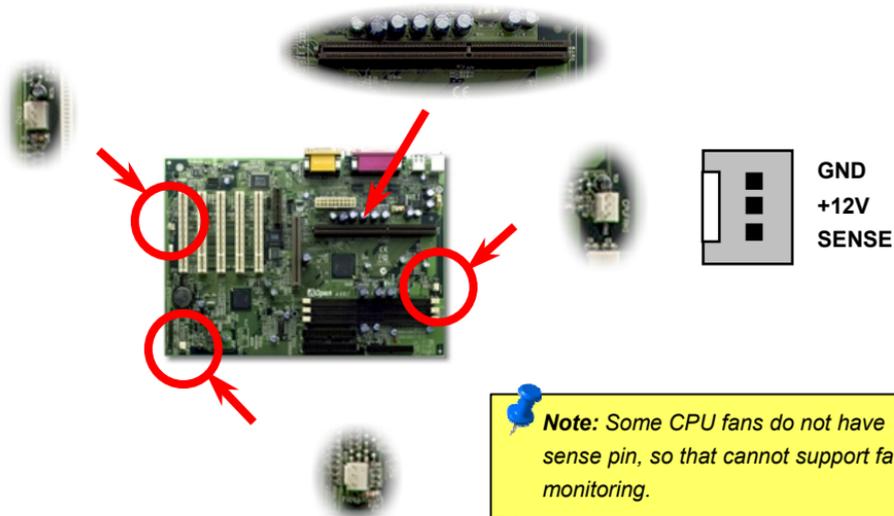
CPU Jumper-less Design

CPU VID signal and SMbus clock generator provide CPU voltage auto-detection and allows the user to set the CPU frequency through the BIOS setup, therefore no jumpers or switches are used. The correct CPU information is saved into the EEPROM. With these technologies, the disadvantages of the Pentium based jumper-less designs are eliminated. There will be no worry of wrong CPU voltage detection and no need to re-open the housing in case of CMOS battery loss.
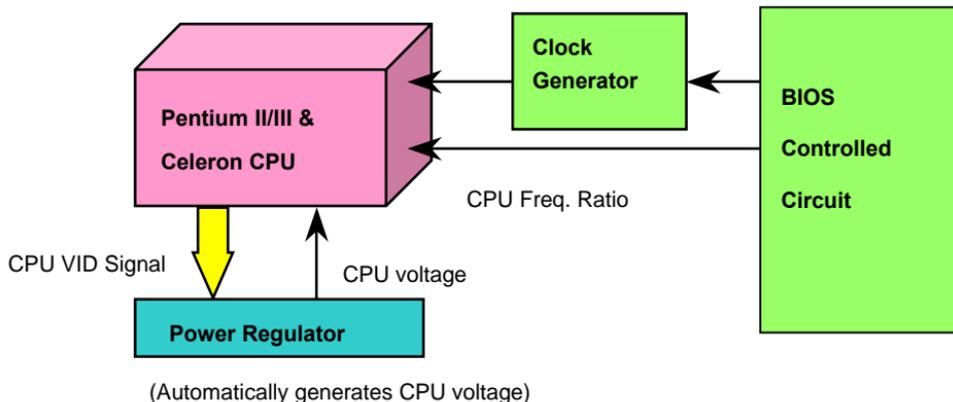
Setting CPU Core Voltage

This motherboard supports CPU VID function. The CPU core voltage will be automatically detected and the range is from 1.3V to 3.5V..

Setting CPU Frequency

This motherboard is CPU jumper-less design, you can set CPU frequency through the BIOS setup, no jumpers or switches are needed.

BIOS Setup > Frequency Control > **CPU Speed Setting**

CPU Ratio	3.5x, 4x, 4.5x, 5x, 5.5x, 6x, 6.5x, 7x, 7.5x, and 8x
CPU **FSB**	100.2, 105, 114, 120, 124, 128.5, 133.3, 133.9, 138, 143, 148, 150, 152.5, 155, and 160 MHz.

> **Warning:** INTEL 820 chipset supports maximum 133MHz FSB and 66MHz AGP clock, higher clock setting may cause serious system damage.

> **Tip:** If your system hangs or fails to boot because of overclocking, simply use JP14 to clear CMOS and restore to the default setting (350MHz when FSB=100MHz; 267MHz when FSB=133.3MHz).

Core Frequency = CPU *FSB* Clock * CPU Ratio

CPU	CPU Core Frequency	FSB Clock	Ratio
Celeron 300A	300MHz =	66MHz	4.5x
Celeron 366	366MHz=	66MHz	5.5x
Celeron 366	366MHz=	66MHz	5.5x
Celeron 400	400MHz=	66MHz	6x
Pentium II 233	233MHz =	66MHz	3.5x
Pentium II 333	333MHz =	66MHz	5x
Pentium II 350	350MHz=	100MHz	3.5x
Pentium II 400	400MHz =	100MHz	4x
Pentium III 450	450MHz=	100MHz	4.5x
Pentium III 500	500MHz =	100MHz	5x
Pentium III 533EB	533MHz =	133MHz	4x
Pentium III 550E	550MHz =	100MHz	5.5x

Pentium III 600E	600MHz =	100MHz	6x
Pentium III 600EB	600MHz =	133MHz	4.5x
Pentium III 650E	650MHz =	100MHz	6.5x
Pentium III 667EB	667MHz =	133MHz	5x
Pentium III 700E	700MHz =	100MHz	7x
Pentium III 733EB	733MHz =	133MHz	5.5x

RIMM Socket

Intel 820 chipset supports 16/18 bit Direct RAMBUS ([RDRAM](#)) configurations and supports a maximum of 32 devices on a RDRAM channel. A channel can be populated with mix of 64Mbit, 128Mbit, and 256Mbit RDRAM devices. Hence, the maximum system memory will be various depends on the number of RDRAM devices and the RDRAM device technology. This motherboard has three 184-pin RIMM sockets that allow you to install system memory up to **1GB**.
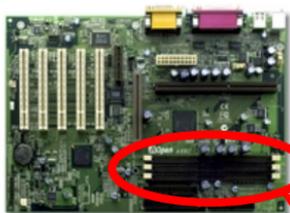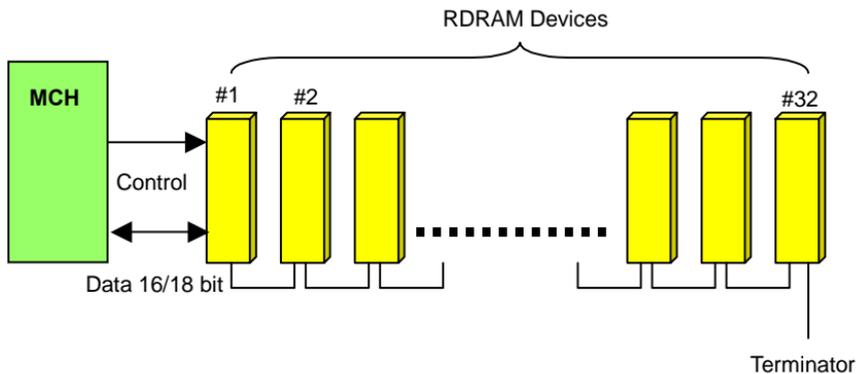
Example Picture of RIMM

Pin 1

RIMM1
RIMM2
RIMM3

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RDRAM Technology	Maximum Memory on Channel
64 or 72Mbit with parity	256MB
128 or 144Mbit with parity	512MB
256 or 288Mbit with parity	1GB

RDRAM Devices

MCH

#1   #2   #32

Control

Data 16/18 bit

Terminator

The [RIMM] modules have Rambus channel signals as their memory interface. A RIMM module may contain up to a maximum of 16 RDRAM devices. All RDRAM devices on a RIMM must have the same timing characteristics. Therefore, empty RIMM sockets **MUST** be populated with **Continuity RIMM modules, (CRIMM)** which will be provided with motherboard.

Rambus Channel

MCH

Terminator

RIMM1   RIMM2   RIMM3
Socket   Socket   Socket
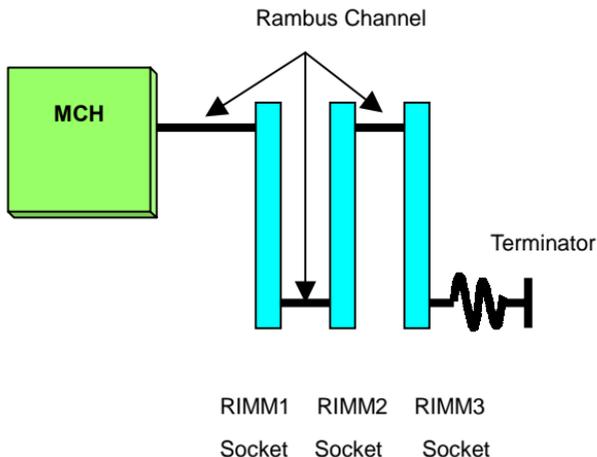
Setting RDRAM Speed

RDRAM speed means the data transfer rate of RDRAM device, for example, PC800 RIMM has 800MBytes/sec data transfer rate. Following table lists 5 kinds of CPU FSB and RDRAM speed configurations that are supported by Intel 820 chipset.

RDRAM Speed	FSB Clock	Ratio	Suggested RDRAM
600MB/s =	100MHz	6x	PC600
800MB/s =	100MHz	8x	PC800
533MB/s =	133.3MHz	4x	PC600
710MB/s =	133.3MHz	5.33x	PC700
800MB/s =	133.3MHz	6x	PC800

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But with AOpen **Full-range RDRAM Speed** technology (patent pending) the combination can be expanded to almost unlimited. The RDRAM speed can be set by going into:
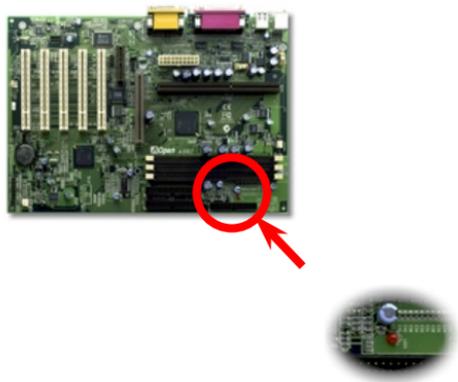
BIOS Setup > Frequency Control > RDRAM Speed
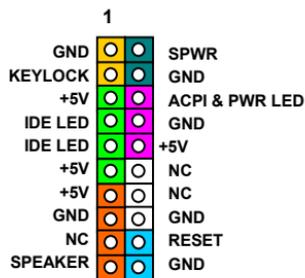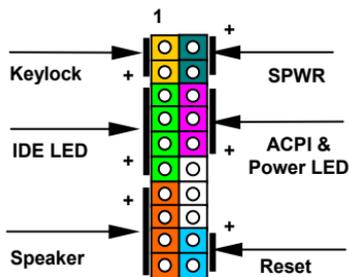
*RDRAM Speed = CPU FSB Clock * RDRAM Ratio*

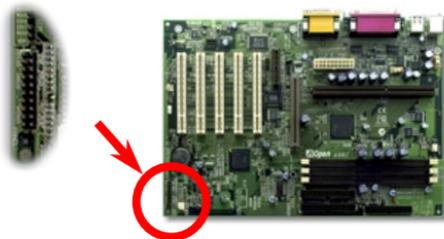| RDRAM Ratio	4x, 4.5x, 5.33x, 6x, 7.11x and 8x
CPU FSB	100.2, 105, 114, 120, 124, 128.5, 133.3, 133.9, 138, 143, 148, 150, 152.5, 155, and 160 MHz.

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RAM Power LED

This LED indicates there is power applies to memory. It is useful to check RAM power during Suspend to RAM. Do not unplug RIMM when this LED is On.

Front Panel Connector

| 1	
GND	SPWR
KEYLOCK	GND
+5V	ACPI & PWR LED
IDE LED	GND
IDE LED	+5V
+5V	NC
+5V	NC
GND	GND
NC	RESET
SPEAKER	GND

Keylock
SPWR
IDE LED
ACPI & Power LED
Speaker
Reset

Attach the power LED, keylock, speaker, and reset switch connectors to the corresponding pins. If you enable Power Management > ACPI Function in BIOS Setup, the ACPI & Power LED will keep flashing while the system is in suspend mode.

Suspend Type	ACPI LED
Power on Suspend (S1)	Flashing for every second
Suspend to RAM (S3)	Flashing for every 4 seconds

Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR**.

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ATX Power Connector

The ATX power supply uses 20-pin connector shown below. Make sure you plug in the right direction.

+5V
+5V
+3.3V
-12V
GND
PWOK
PWOK
5VSB
+12V
+5V
-5V
GND
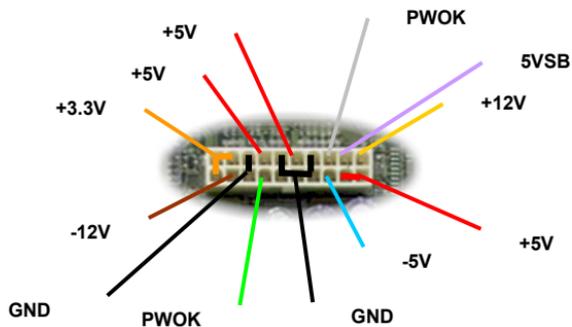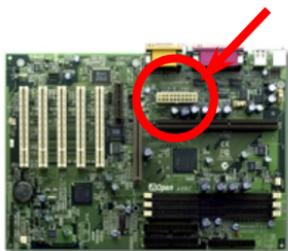
AC Power Auto Recovery

A traditional ATX system should remain at power off stage when AC power resumes from power failure. This design is inconvenient for a network server or workstation, without an UPS, that needs to keep power-on. This motherboard implements an AC Power Auto Recovery function to solve this problem. If BIOS Setup > Integrated Peripherals > AC PWR Auto Recovery is set to "Enabled" the system will automatically power-on after AC power resumes.

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IDE and Floppy Connector

Connect 34-pin floppy cable and 40-pin IDE cable to floppy connector FDC and IDE connector **IDE1**, **IDE2**. Pin1 of cable is normally marked with red color. Be careful of the pin1 orientation. Wrong orientation may cause system damage.

Slave (4th)   Master (3rd)

IDE2 (Secondary)

IDE1 (Primary)   FDC

Pin 1   Pin 1

Slave (2nd)   Master (1st)

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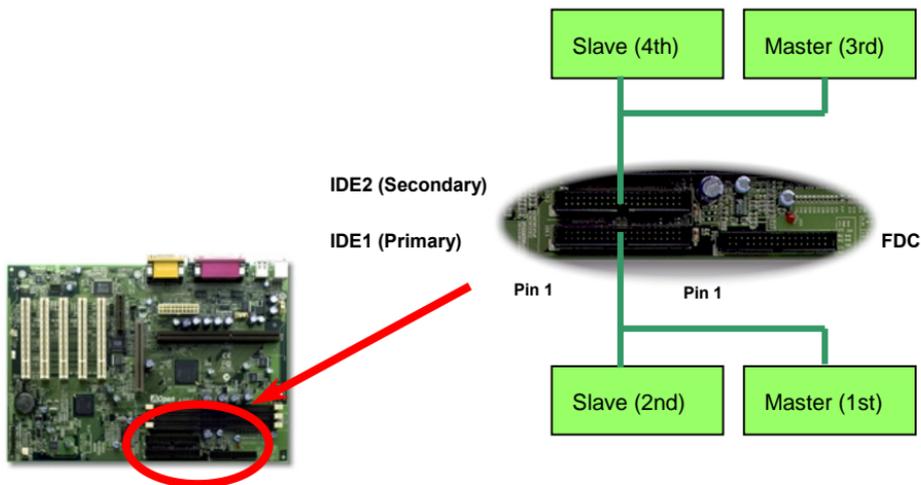
IDE1 is also known as the primary channel and IDE2 as the secondary channel. Each channel supports two IDE devices that make a total of four devices. In order to work together, the two devices on each channel must be set differently to **master** and **slave** mode. Either one can be the hard disk or the CDROM. The setting as master or slave mode depends on the jumper on your IDE device, so please refer to your hard disk and CDROM manual accordingly.

Warning: The specification of the IDE cable is a maximum of 46cm (18 inches), make sure your cable does not exceed this length.

Tip: For better signal quality, it is recommended to set the far end side device to master mode and follow the suggested sequence to install your new device. Please refer to above diagram.

A Open

This motherboard supports ATA/66 IDE. Following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

Mode	Clock Period	Clock Count	Cycle Time	Data Transfer Rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s
PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
UDMA/33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s
UDMA/66	30ns	2	60ns	(1/60ns) x 2byte x2 = 66MB/s
UDMA/100	20ns	2	40ns	(1/40ns) x 2byte x2 = 100MB/s

> *Tip: To achieve the best performance of Ultra DMA/66 hard disks, a special **80-wires IDE cable** is required..*

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IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Windows 95 Direct Cable Connection, the user can transfer files to or from laptops, notebooks, PDA devices and printers. This connector supports SIR (115.2Kbps, 2 meters) and ASK-IR (57.6Kbps).

Install the infrared module onto the **IrDA** connector and enable the infrared function from BIOS Setup > Integrated Peripherals > UART Mode Select, make sure to have the correct orientation when you plug in the IrDA connector.

Pin 1

```
          1   2
+5V  | O   O |  NC
NC   | O   O |  CIRRX
IRRX | O   O |  5VSB
GND  | O   O |  NC
IRTX | O     |  NC
          9  10
```

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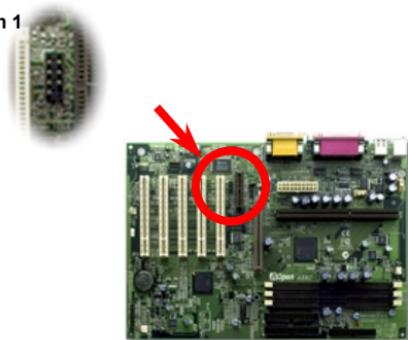
WOM (Zero Voltage Wake on Modem)

This motherboard implements special circuit to support Wake On Modem, both internal modem card and external box modem are supported. Since Internal modem card consumes no power when system power is off, it is recommended to use an internal modem. To use internal modem, connect 4-pin cable from **RING** connector of modem card to the **WOM** connector on the motherboard.

Pin 1

1

+5V Standby
NC
RING
GND
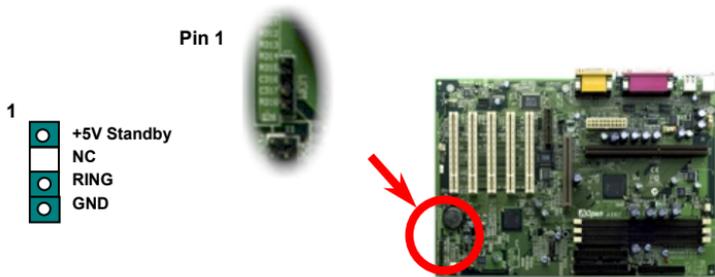
WOM by External BOX Modem

Traditional Green PC suspend mode does not really turn off the system power supply, it uses external box modem to trigger MB COM port and resume back to active.

TEL Line

Box Modem

COM port

Motherboard
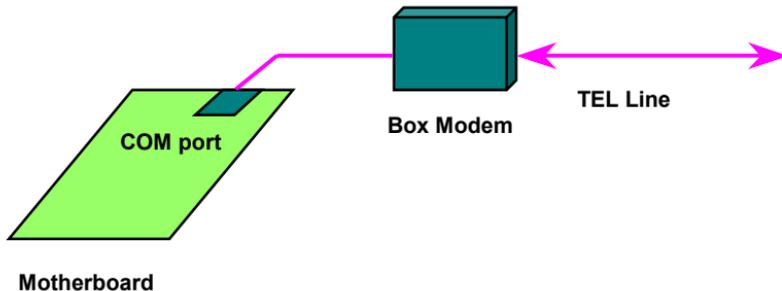
WOM by Internal Modem Card

With the help of the ATX soft power On/Off, it is possible to have a system totally power off, and wakeup to automatically answer a phone call as an answering machine or to send/receive a fax. You may identify whether or not your system is in true power off mode by checking to see if the fan of your power supply is off. Both an external box modem and an internal modem card can be used to support Modem Wake Up, but if you use an external modem, you have to leave your box modem on.

Modem Card

TEL Line
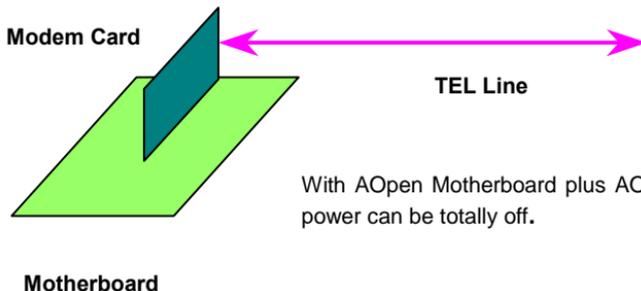
With AOpen Motherboard plus AOpen Modem Card, the power can be totally off**.**

Motherboard

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WOL (Wake on LAN)

This feature is very similar as Wake On Modem, but it goes through local area network. To use Wake On LAN function, you must have a network card with chipset that supports this feature, and connect a cable from LAN card to motherboard WOL connector. The system identification information (probably IP address) is stored on network card and because there is a lot of traffic on the Ethernet, you need to install a network management software, such as ADM, for the checking of how to wake up the system. Note that, at least 600mA ATX standby current is required to support the LAN card for this function.

Pin 1

+5V Standby
GND
LID

LAN Card

Ethernet
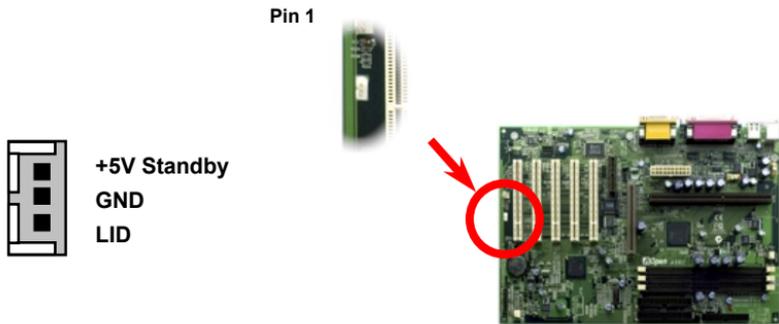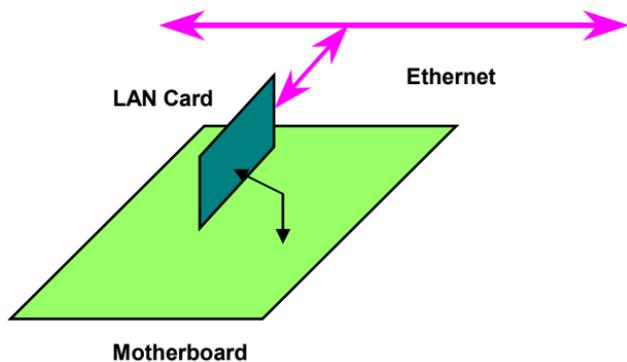
Motherboard

4X AGP (Accelerated Graphic Port)

This motherboard supports 4X AGP. AGP is a bus interface designed for high-performance 3D graphic and supports only memory read/write operation. One motherboard can only have one AGP slot. **2X AGP** uses both rising and falling edge of the 66MHz clock, the data transfer rate is 66MHz x 4 bytes x 2 = 528MB/s. **4X AGP** is still using 66MHz AGP clock but the it has 4 data transfers within one 66MHz clock cycle, so that the data transfer rate is 66MHz x 4 bytes x 4 = 1056MB/s.
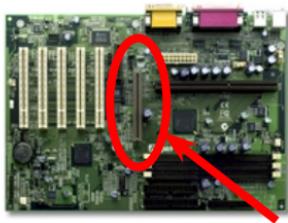
AMR (Audio/Modem Riser)

AMR is a riser card that supports sound or modem function. Because CPU computing power is getting stronger, the digital processing job can be implemented in main chipset and share CPU power. The analog conversion (CODEC) circuit requires a different and separate circuit design, it is put on AMR card. This motherboard implements sound CODEC on board (can be disabled by JP29), but reserve AMR slot for the option of modem function. Note that you can still use PCI modem card.

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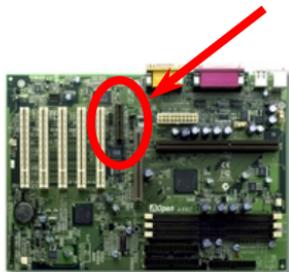
This motherboard is [AC97](#) sound onboard. That is, audio CODEC is put on motherboard and modem function is supported by AMR card.

AOpen
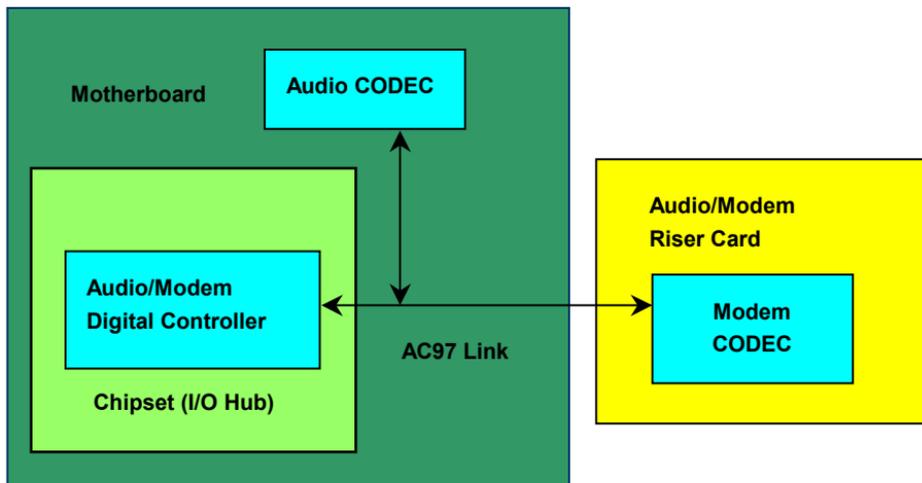
PC99 Color Coded Back Panel

The onboard I/O devices are PS/2 Keyboard, PS/2 Mouse, serial ports COM1 and COM2, Printer, two USB, AC97 sound and Game port. The view angle of drawing shown here is from the back panel of the housing.
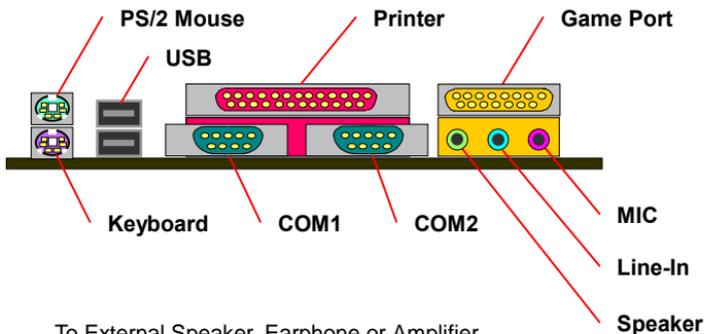
Speaker:	To External Speaker, Earphone or Amplifier.
Line-In:	From signal source such as CD/Tape player.
MIC:	From Microphone

JP29 Enable/Disable Onboard Sound Chip

This motherboard has AC97 sound onboard. JP29 is used to enable or disable onboard AD1881 CODEC chip. If you select Disable, you can use your preferred AMR sound card.

1 2 3

Enable   **Disable**
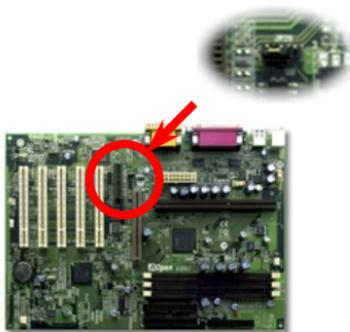
CD Audio Connector

This connector is used to connect CD Audio cable from CDROM or DVD drive to onboard sound.

Pin 1
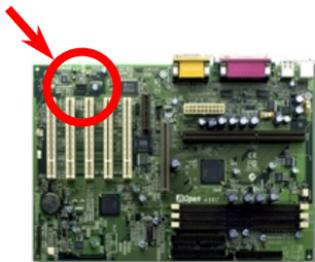
CD-IN

1 2 3 4

1	L
2	GND
3	GND
4	R

Modem Audio Connector

This connector is used to connect Mono In/Mic Out cable from internal modem card to onboard sound circuit. The pin 1-2 is **Mono In**, and the pin 3-4 is **Mic Out**. Please note that there is no standard for this kind of connector yet, only some internal modem cards implement this connector.

Pin 1

MODEM-CN

1 2 3 4
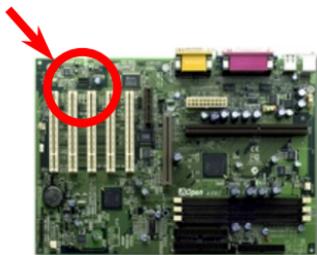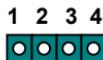
1	Mono In
2	GND
3	GND
4	Mic Out

*A*Open

Battery-less and Long Life Design

This Motherboard implements EEPROM and a special circuit that allows you to save your current CPU and CMOS Setup configurations without the need of a battery. The RTC (real time clock) can also keep running as long as the power cord is plugged. If you lose your CMOS data by accident, you can just reload the CMOS configurations from EEPROM and the system will recover as usual.

> *Tip: For your convenience, this motherboard is still shipped with one Lithium (CR-2032) battery in the battery socket. If you prefer to use battery, you can keep it in the socket. The RTC will still keep running even power cord is removed.*

ATX standby power   **Battery**

Auto Switch

Auto switch to ATX standby power as long as AC power line is plugged. This smart design increases battery life if you still plug battery on motherboard.

RTC real time clock

00:00:00

EEPROM ←→ **CMOS**

Backup by EEPROM
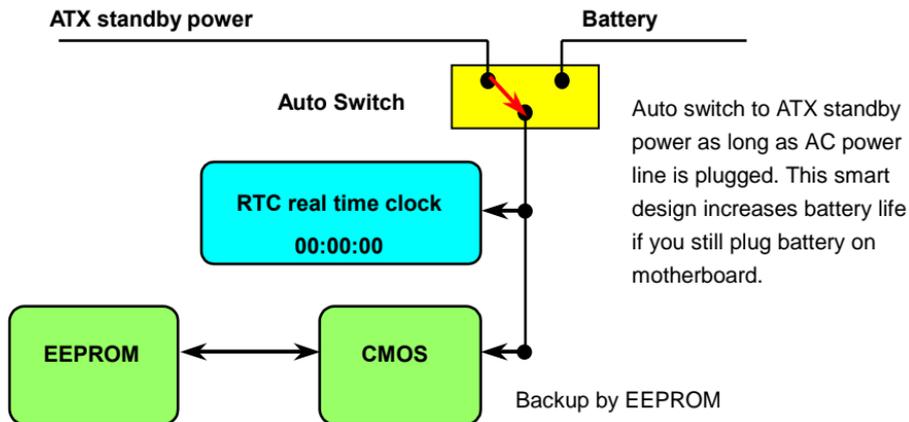
Over-current Protection

The Over Current Protection was very popular implemented on ATX 3.3V/5V/12V switching power supply. However, the new generation CPU uses different voltage that has regulator to transfer 5V to CPU voltage (for example, 2.0V), and makes 5V over current protection useless. This motherboard with switching regulator onboard support CPU over-current protection, in conjunction with 3.3V/5V/12V power supply provide the full line over-current protection.
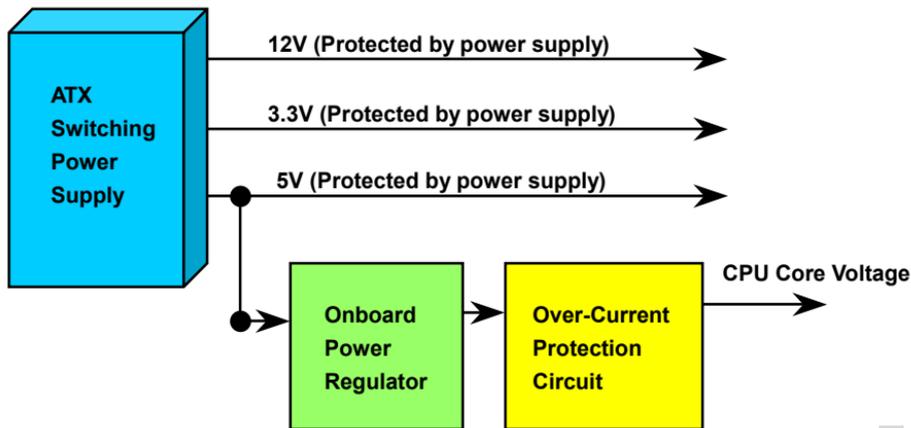
*Note: Although we have implemented protection circuit try to prevent any human operating mistake, there is still certain risk that CPU, memory, HDD, add-on cards that install on this motherboard may be damaged because of component failure, human operating error or unknown nature reason. **AOpen cannot guaranty the protection circuit will always work perfectly.***

AOpen

Hardware Monitoring

This motherboard implements a hardware monitoring system. As you turn on your system, this smart design will continue to monitor your system's working voltage, fan status and CPU temperature.   If any of these system's status go wrong, there will be an alarm through the AOpen Hardware Monitoring Utility to warn the user.

A Open
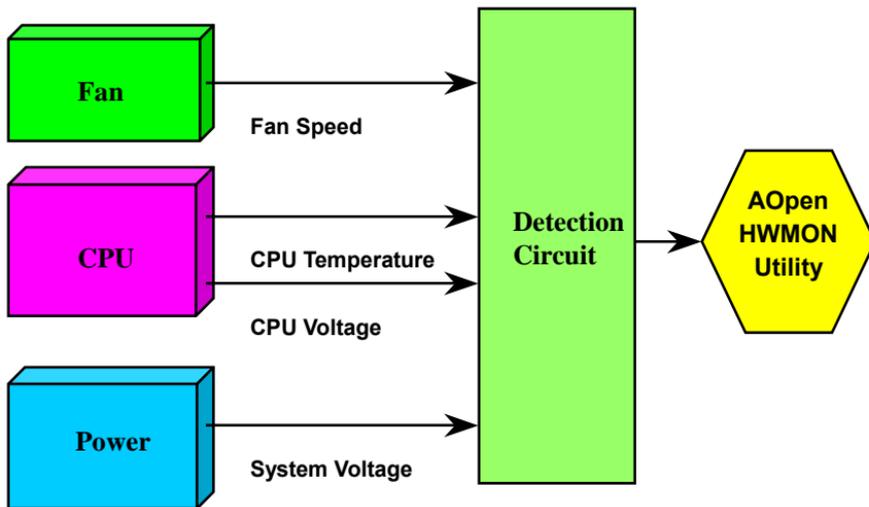
Resettable Fuse

Traditional motherboard has fuse for Keyboard and USB port to prevent over-current or shortage. These fuses are soldered onboard that when it is broken (did the job to protect motherboard), user still cannot replace it and the motherboard is still malfunction.

With expensive Resettable Fuse, the motherboard can back to normal function after fuse did the protection job.
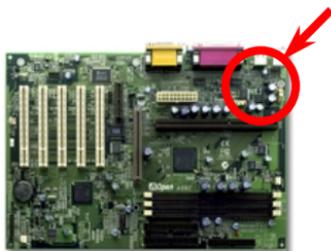
The green part at the left side of JP28.

A Open

BIOS Write Protection

Recently, many viruses have been found that may destroy bios code and data area. This motherboard implements two layers firewall to protect from unauthorized writing to BIOS. One is hardware and the other is software.

Access to BIOS

Hardware Protection

Software Protection

Flash ROM BIOS
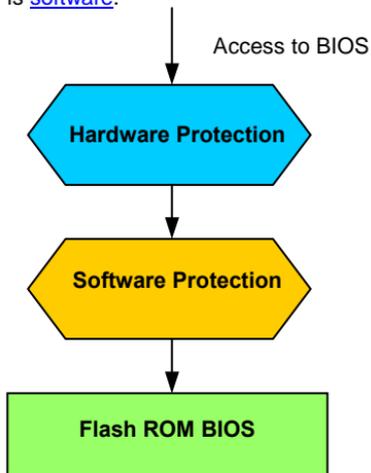
Year 2000 (Y2K)

Y2K is basically a problem of the identification of year code. To save storage space, traditional software uses only two digits for year identification. For example, 98 for 1998 and 99 for 1999, but 00 will be confused with 1900 and 2000.

There is an RTC circuit (Real Time Clock) in conjunction with 128 bytes of CMOS RAM data in the chipset of the motherboard. The RTC has only two digits and the CMOS has another 2 digits. Unfortunately, this circuit's behavior is like this 1997→ 1998 → 1999 → 1900, that means it may have the Y2K problem. Below is a diagram of how applications work with the OS, BIOS and RTC. In order to keep the best compatibility in the PC industry there is a rule that applications must call the OS to get services and OS must call the BIOS, and then only BIOS is allowed to access the hardware (RTC) directly.

```
                    ┌─────────────────────────────────┐
                    │          Applications           │
                    └─────────────────────────────────┘
                                   ⇕
        ┌─────────────────────────────────────────────────────┐
        │     Operating System (such as Windows 98)           │
        └─────────────────────────────────────────────────────┘
                                   ⇕
                ┌─────────────────────────────────────┐
                │        BIOS (Tick Routine)          │
                └─────────────────────────────────────┘
                                   ⇕
                ┌─────────────────────────────────────┐
                │        RTC and CMOS data            │
                └─────────────────────────────────────┘
```
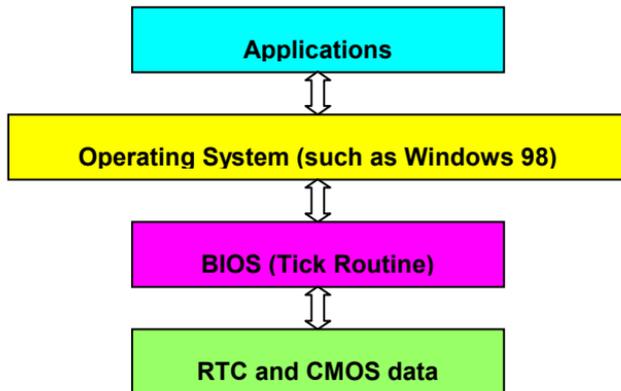
There is a Tick Routine (that goes live around every 50m sec) in the BIOS to keep record of date/time information. In general the BIOS, this Tick Routine does not update the CMOS every time because the CMOS is a very slow device which degrades system performance. The Tick Routine of the AOpen BIOS has 4 digits for year coding, as long as applications and the operating system follow the rule to get date/time information. There will be no Y2K problem (such as NSTL's test program). But unfortunately again, we found some test programs (such as Checkit 98) accesses RTC/CMOS directly.

Low ESR Capacitor

The quality of low ESR capacitor (Low Equivalent Series Resistance) during high frequency operation is very important for stability of CPU power. The location of where to put these capacitors is another know-how that requires experience and detail calculation.
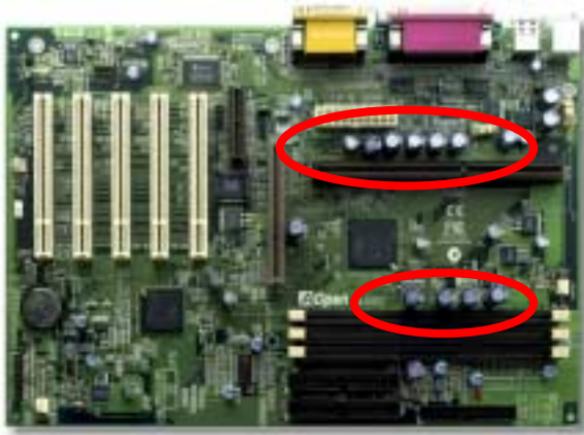
The power circuit of the CPU core voltage must be checked to ensure system stability for high speed CPUs (such as the new Pentium III, or when overclocking). A typical CPU core voltage is 2.0V, so a good design should control voltage between 1.860V and 2.140V. That is, the transient must be below 280mV. Below is a timing diagram captured by a Digital Storage Scope, it shows the voltage transient is only 143mv even when maximum 18A current is applied.
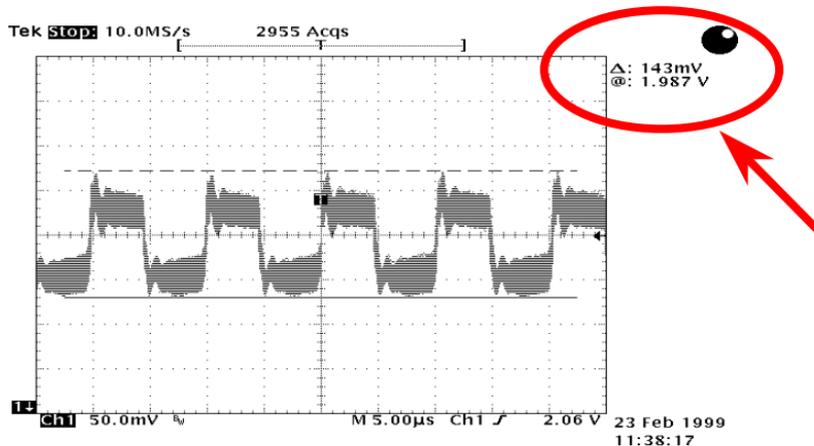
Layout (Frequency Isolation Wall)
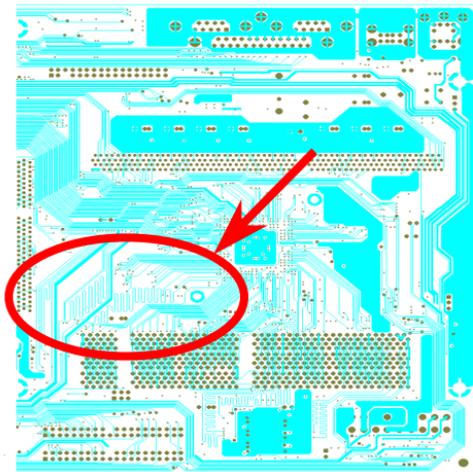
Note: This diagram is for example only, it may not be exactly the same as this motherboard.

For high frequency operation, especially overclocking, layout is the most important factor to make sure chipset and CPU working in stable condition. The layout of this motherboard implements AOpen's unique design called " Frequency Isolation Wall". Separating each critical portion of motherboard into regions where each region operates in a same or similar frequency range to avoid crosstalk and frequency interference between each region's operations and condition. The trace length and route must be calculated carefully. For example, the clock trace must be equal length (not necessarily as short as possible) so that clock skew will be controlled within few a pico second $(1/10^{12}\,\text{Sec})$

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Driver and Utility

There are motherboard drivers and utilities included in AOpen Bonus CD disc. You don't need to install all of them in order to boot your system. But after you finish the hardware installation, you have to install your operation system first (such as Windows 98) before you can install any drivers or utilities. Please refer to your operation system's installation guide.

Autorun Menu from Bonus CD Disc

You can use the autorun menu of Bonus CD disc. Choose the utility and driver and select model name
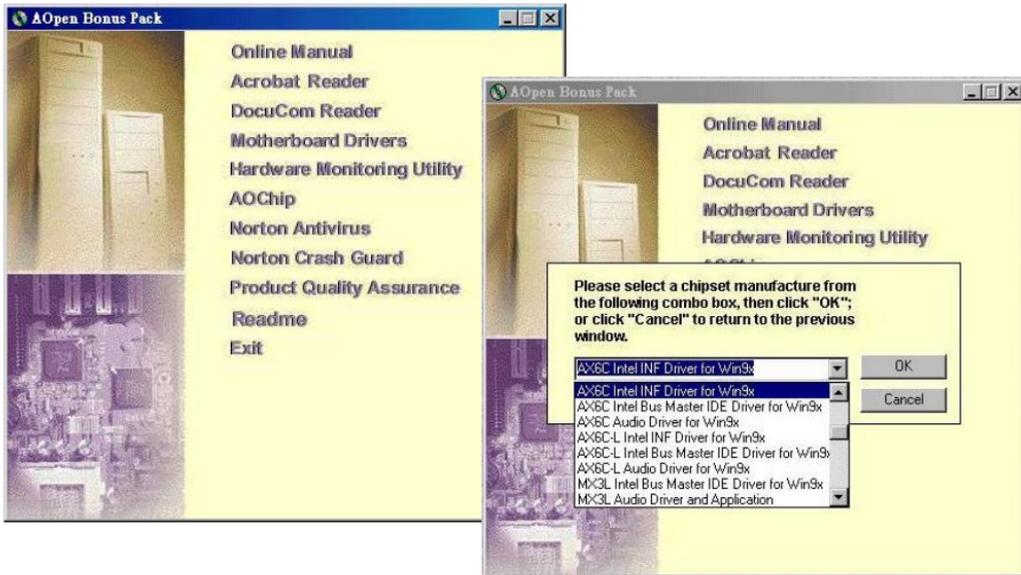
Eliminate "?" mark from Windows 95/98

Windows 95/98 cannot recognize this chipset, because it was released before the Intel 820 chipset. You can install the Intel INF Update Utility from the Bonus Pack CD disc autorun menu to eliminate the "?" marks.
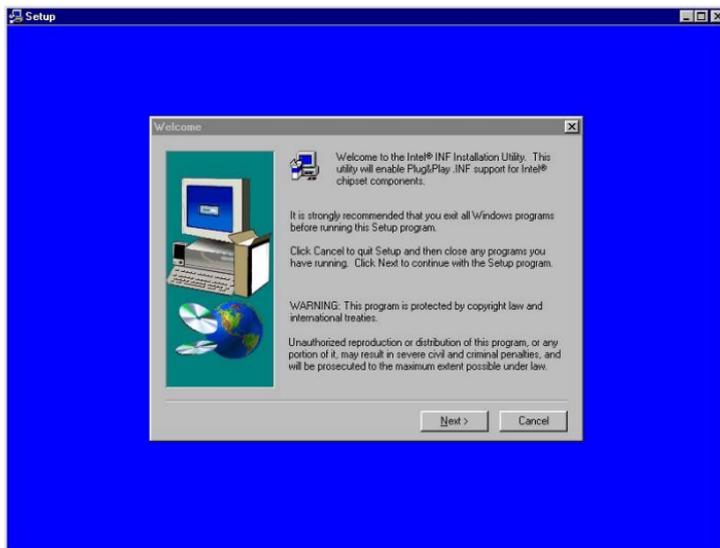
Installing Onboard Sound Driver

This motherboard comes with an AD 1881 AC97 CODEC. You can find the audio driver from the Bonus Pack CD disc autorun menu.
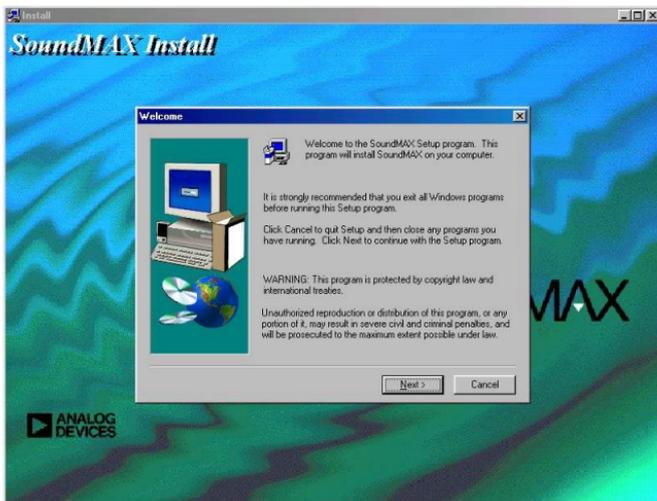
Installing Bus Master IDE Driver

It is necessary to install Bus Master IDE driver to support ATA/66 hard disk. If you need this driver, you can find it in the AOpen Bonus Pack CD disc.

Intel PIIX Bus Master IDE Driver for Windows* 95 Setup

Intel PIIX Bus Master IDE Driver for Windows* 95 Setup
Copyright, (c) 1997-1998 Intel Corporation
Version 3.02.0.0 Production Release

Welcome

SETUP requires systems with Windows 95 and a PIIX Bus Master IDE Controller. You must close/exit all Windows programs before running this program. See README.TXT for more information.

You must read and agree to the license agreement in order to continue the program. Click Cancel to quit Setup or click Next to view license agreement and continue with Setup program.

WARNING: This program is protected by copyright law and international treaties.

Unauthorized reproduction or distribution of this program, or any portion of it, may result in severe civil and criminal penalties, and violators will be prosecuted to the maximum extent possible under law.

[< Back] [Next >] [Cancel]

Note: Installing this Bus Master IDE driver may cause Suspend to Hard Drive failure.

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Installing Hardware Monitoring Utility

You can install Hardware Monitoring Utility to monitor CPU temperature, fans and system voltage. You can find it in the AOpen Bonus Pack CD disc.

AOpen
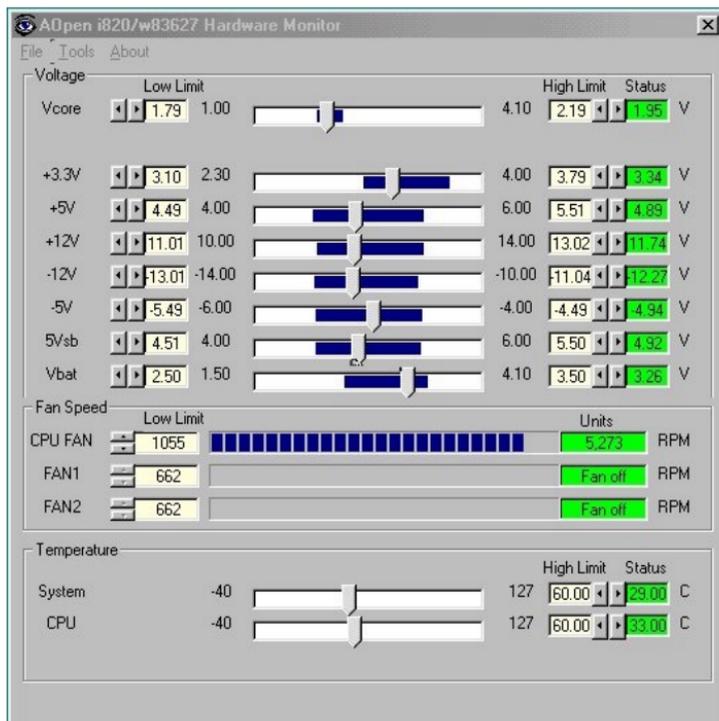
ACPI Suspend to Hard Drive

ACPI Suspend to Hard Drive is basically controlled by Windows operation system. It saves your current work (system status, memory and screen image) into hard disk, and then the system can be totally power off. Next time, when power is on, you can resume your original work directly from hard disk within few seconds without go through the Windows booting process and run your application again. If your memory is 64MB, normally, you need to reserve at least 64MB HDD space to save your memory image.

A Open

When go into Suspend:


```
┌─────────────┐                        ┌──────────┐
│  System     │                        │          │
│  Image &    │────── Save into ──────▶│  Hard    │
│  Status     │                        │  Disk    │
└─────────────┘                        └──────────┘
```

When power-on next time:


```
┌─────────────┐                        ┌──────────┐
│  System     │                        │          │
│  Image &    │◀───────────────────────│  Hard    │
│  Status     │                        │  Disk    │
└─────────────┘                        └──────────┘
```

Restore within

seconds
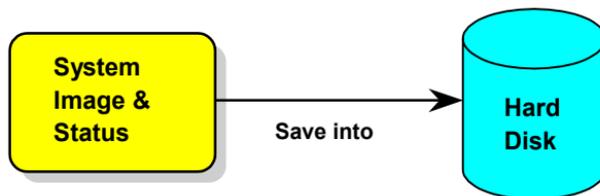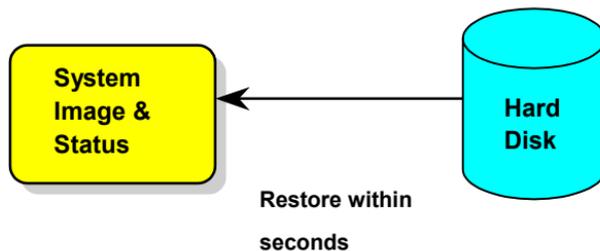
System Requirement

1.   **AOZVHDD.EXE 1.30b** or later.

2.   Delete **config.sys** and **autoexec.bat**.

Fresh installation of Windows 98 on a new system

1. Execute "**Setup.exe /p j**" to install Windows 98

2. After Windows 98's installation is complete, go to the Control Panel > Power Management.

   a. Set Power Schemes > System Standby to "Never".

   b. Click on "Hibernate" and select "Enable Hibernate Support" then "Apply".

   c. Click on the "Advanced" tab, you'll see "Hibernate" on "Power Buttons". Note that this option
       will only be seen after step b mentioned above has been completed, otherwise only
       "Standby" and "Shutdown" will be shown. Select "Hibernate" and "Apply".

1.   Clean boot into DOS and run AOZVHDD utility.

   a. If you assign the whole disk to your Win 98 system (FAT 16 or FAT 32), please run
       "**aozvhdd /c /file**". Please remember sufficient free space has to be reserved in the disk, e.g.
       if you have 64 MB DRAM and 16 MB VGA card installed, the system needs at least 80 MB
       free space. The utility will locate the space automatically.

b. If you assign an individual partition for Win 98, please run "**aozvhdd /c /partition**". Of course, the system needs to provide unformatted an empty partition.

2. Reboot system.

3. You've already implemented ACPI Suspend to-Hard Drive. Click "Start > Shut Down > Standby" then the screen will go off immediately. And 1 minute or so will be taken for the system to save what's in the memory to the hard drive; the larger the memory size the longer this process will take.

Changing from APM to ACPI (Windows 98 only)

1. Run "**Regedit.exe**"

    a. Go through the following path

      HKEY_LOCAL_MACHINE

        SOFTWARE

          MICROSOFT

            WINDOWS

              CURRENT VERSION

              DETECT

    b. Select "ADD Binary" and name it as "**ACPIOPTION**".

    c. Right click and select Modify, add "01" after "0000" to make it "0000 01".

    d. Save changes.

2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "**ACPI BIOS**" and remove "**Plug and Play BIOS**")

3. Reboot system.

4. Clean boot into DOS and run "AOZVHDD.EXE /C /File"

Changing from ACPI to APM

1. Run "**Regedit.exe**"

   a. Go through the following path

     HKEY_LOCAL_MACHINE

       SOFTWARE

         MICROSOFT

           WINDOWS

             CURRENT VERSION

              DETECT

               ACPI OPTION

   b. Right click and select "Modify, change "01" to "00" to make it "0000 02".

> *Tip: "02" means Windows 98 is ACPI acknowledged but the ACPI function is disabled.*
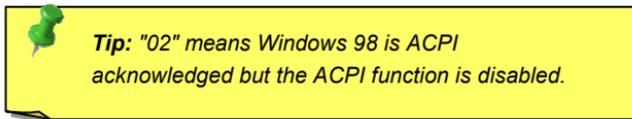
   c. Save changes.

2. Select "Add New Hardware" under Control Panel. Allow Windows 98 to detect new hardware. (It will find "**Plug and Play BIOS**" and **remove "ACPI BIOS**")

3. Reboot system.

4. Run "Add New Hardware" again and it will find "Advanced Power Management Resource".

5. Click "OK".

> *Tip: Currently we found only ATI 3D Rage Pro AGP card would support ACPI suspend to disk. Please refer to AOpen web site for latest update.*

ACPI Suspend to RAM (STR)

This motherboard supports ACPI Suspend to RAM function. With this function, you can resume your original work directly from DRAM without going through the Windows 98 booting process and run your application again. Suspend to DRAM saves your current work in the system memory, it is faster than Suspend to Hard Drive but requires power supplied to DRAM, while Suspend to Hard Drive requires no power.

When go into Suspend:

| System Image & Status in the DRAM | Backuped by 3.3V Power | Other System Devices | ✕ Power loss |

When power-on next time:

| System Image & Status in the DRAM | Power back to work | Other System Devices | Power back to work |

A Open
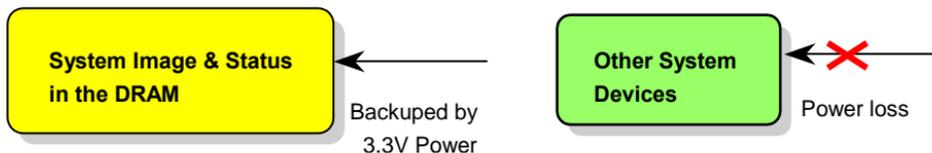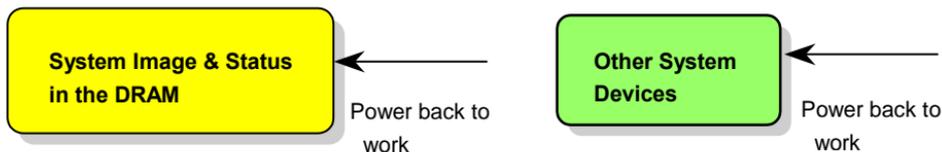
To implement ACPI Suspend to DRAM, please follow the procedures as below:

System Requirement

1. An ACPI OS is required. Currently, Windows 98 is the only choice. Please refer to ACPI Suspend to Hard Drive of how to setup Windows 98 ACPI mode.
2. The Intel INF Update Utility must be installed properly.

Procedures

1. Changed the following BIOS settings.

    BIOS Setup > Power Management > ACPI Function   : Enabled

    BIOS Setup > Power Management > ACPI Suspend Type   :S3.

2. Go to Control Panel > Power Management. Set "Power Buttons" to "Standby".
3. Press power button or standby button to wake up the system.

AWARD BIOS

System parameters can be modified by going into <u>BIOS</u> Setup menu, this menu allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or in the main chipset). <u>To enter to BIOS setup menu</u>, press <Del> when <u>POST (Power-On Self Test)</u> screen is shown on your monitor.
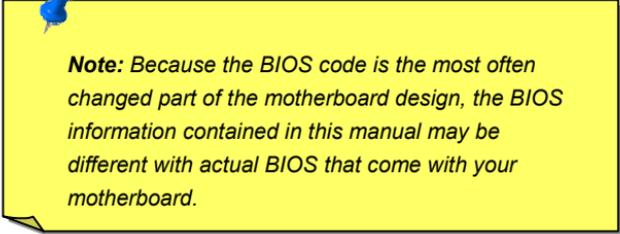
> *Note: Because the BIOS code is the most often changed part of the motherboard design, the BIOS information contained in this manual may be different with actual BIOS that come with your motherboard.*

Enter BIOS Setup

Del

After you finish the setting of jumpers and connect correct cables. Power on and enter the BIOS Setup, press <Del> during POST (Power-On Self Test). Choose "Load Setup Defaults" for recommended optimal performance.

```
       CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
   ▶ Standard CMOS Features              Load Setup Defaults
   ▶ Advanced BIOS Features              Load Turbo Defaults
   ▶ Advanced Chipset Features           Set Password
   ▶ Integrated Peripherals              Save & Exit Setup
   ▶ Power Management Setup              Exit Without Saving
   ▶ PnP/PCI Configurations              Load EEPROM Defaults
   ▶ PC Health Status                    Save EEPROM Defaults
   ▶ Frequency/Voltage Control

   Esc : Quit        F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup                  <Shift>F3 : Change Language
```

Warning: Please avoid of using "Load Turbo Defaults", unless you are sure your system components (CPU, DRAM, HDD, etc.) are good enough for turbo setting.

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Change Language

F3

You can change language by press <F3>. Depends on available BIOS space. The possible languages are English, German, Japanese and Chinese.

```
        CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
    ▶ Standard CMOS Features            Load Setup Defaults
    ▶ Advanced BIOS Features            Load Turbo Defaults
    ▶ Advanced Chipset Features         Set Password
    ▶ Integrated Peripherals            Save & Exit Setup
    ▶ Power Management Setup            Exit Without Saving
    ▶ PnP/PCI Configurations            Load EEPROM Defaults
    ▶ PC Health Status                  Save EEPROM Defaults
    ▶ Frequency/Voltage Control

    Esc : Quit        F9 : Menu in BIOS      ↑↓→← : Select Item
    F10 : Save & Exit Setup               (Shift)F3 : Change Language

                    Time, Date, Hard Disk Type...
```

Standard CMOS Features

The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and <PgUp> or <PgDn> to select the value for each item.

```
        CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                            Standard CMOS Features

      Date (mm:dd:yy)            Fri, Dec 31 1999        Item Help
      Time (hh:mm:ss)            16 : 30 : 25
                                                     Menu Level   ►
    ► IDE Primary Master         Press Enter None
    ► IDE Primary Slave          Press Enter None      Change the day, month,
    ► IDE Secondary Master       Press Enter None      year and century
    ► IDE Secondary Slave        Press Enter None

      Drive A                    1.44M, 3.5 in.
      Drive B                    None

      Video                      EGA/VGA
      Halt On                    All Errors

      Base Memory                   640K
      Extended Memory             64512K
      Total Memory                65536K


    ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F3:Language  F5:Previous Values  F6:Setup Defaults  F7:Turbo Defaults
```

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Standard CMOS Features > Date

To set the date, highlight the Date parameter. Press <PgUp> or <PgDn> to set the current date. The date format is month, date, and year.

Standard CMOS Features > Time

To set the time, highlight the Time parameter. Press <PgUp> or <PgDn> to set the current time in hour, minute, and second format.   The time is based on the 24 hour military clock.

Standard CMOS Features > Primary Master

Standard CMOS Features > Primary Slave

Standard CMOS Features > Secondary Master

Standard CMOS Features > Secondary Slave

Type
None
Auto
Manual

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto**, which enables BIOS to automatically detect the parameters of installed HDD (Hard Disk Drive) at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select Manual. The IDE CDROM is always automatically detected.

Standard CMOS Features > Drive A

Standard CMOS Features > Drive B

Drive A
None
360KB 5.25"
1.2MB 5.25"
720KB 3.5"
1.44MB 3.5"
2.88MB 3.5"

These items select the floppy drive type. The available settings and types supported by the motherboard are listed to the left.

Standard CMOS Features > Video

Video
EGA/VGA
CGA40
CGA80
Mono

This item specifies the type of video card in use.   The default setting is VGA/EGA. Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

Standard CMOS Features > Halt On

| **Halt On** |
| No Errors |
| All Errors |
| All, But Keyboard |
| All, But Diskette |
| All, But Disk/Key |

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

Advanced BIOS Features

This screen appears when you select the option "Advanced BIOS Features" from the main menu.

```
      CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                         Advanced BIOS Features

   Virus Warning                   Disabled          Item Help
   CPU Internal Cache              Enabled
   External Cache                  Enabled        Menu Level    ▶
   CPU L2 Cache ECC Checking       Enabled
   Processor Number Feature        Enabled        Allows you to choose
   Quick Power On Self Test        Enabled        the VIRUS warning
   First Boot device               CDROM          feature for IDE Hard
   Second Boot device              A:             Disk boot sector
   Third Boot device               C:             protection. If this
   Boot other device               Enabled        function is enabled
   Swap Floppy Drive               Disabled       and someone attempt to
   Boot Up Floppy Seek             Disabled       write data into this
   Boot Up NumLock Status          Off            area, BIOS will show a
   Typematic Rate Setting          Disabled       warning message on
 x Typematic Rate (Chars/Sec)      6              screen and alarm beep
 x Typematic Delay (Msec)          250
   Security Option                 Setup
   OS Select For DRAM > 64MB       Non-OS2
   Show Logo On Screen             Enabled

 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
 F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

Advanced BIOS Features > Virus Warning

<u>Virus Warning</u>
Enabled
Disabled

Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion. Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

```
                       ! WARNING !
              Disk Boot Sector is to be modified
   Type "Y" to accept write, or "N" to abort write
                   Award Software, Inc.
```

Advanced BIOS Features > Internal Cache

| **External Cache** |
| Enabled |
| Disabled |

Enabling this parameter activates the CPU internal cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

Advanced BIOS Features > External Cache

| **External Cache** |
| Enabled |
| Disabled |

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

Advanced BIOS Features > CPU L2 Cache ECC Checking

| **CPU L2 Cache ECC Checking** |
| Enabled |
| Disabled |

This item lets you enable or disable L2 Cache ECC checking.

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Advanced BIOS Features > Processor Number Feature

Processor Number Feature Enabled Disabled

This item is used to enable or disable Pentium III CPU Number Feature.

Advanced BIOS Features > Quick Power On Self Test

Quick Power on Self test Enable Disabled

This parameter speeds up POST by skipping some items that are normally checked.

Advanced BIOS Features > First Boot Device

Advanced BIOS Features > Second Boot Device

Advanced BIOS Features > Third Boot Device

First Boot Device
A:
LS/ZIP
C:
SCSI
CDROM
D:
E:
F:
LAN
Disabled

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:

C: Primary master

D: Primary slave

E: Secondary master

F: Secondary slave

LS: LS120

Zip: IOMEGA ZIP Drive

LAN: LAN card with boot ROM

Advanced BIOS Features > Boot Other Device

Boot Other Device
Enabled
Disabled

This parameter allows you to enable other system boot up devices that is not described above.

Advanced BIOS Features > Swap Floppy Drive

Swap Floppy Drive
Enabled
Disabled

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.

Advanced BIOS Features > Boot Up Floppy Seek

Boot Up Floppy Seek
On
Off

Setting this parameter to enable/disable floppy seek test during Power On Self Test.

Advanced BIOS Features > Boot Up NumLock Status

Boot Up NumLock Status
On
Off

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

Advanced BIOS Features > Typematic Rate Setting

Typematic Rate Setting
Enabled
Disabled

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

Advanced BIOS Features > Typematic Rate (Chars/Sec)

Typematic Rate
6, 8, 10, 12, 15, 20, 24, 30

This item allows you to control the speed of repeated keystrokes. The default is 30 characters/sec.

Advanced BIOS Features > Typematic Delay (Msec)

Typematic Delay
250, 500, 750, 1000

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin).

Advanced BIOS Features > Security Option

Security Option
Setup
System

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

Advanced BIOS Features > OS Select for DRAM > 64MB

OS Select for DRAM > 64MB
OS/2
Non-OS/2

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

AOpen

Advanced BIOS Features > Show Logo On Screen

| **Show Logo On Screen** |
| Enabled |
| Disabled |

This item lets you show or hide AOpen logo on the POST screen.

Advanced Chipset Features

The "Advanced Chipset Features" includes settings for the chipset dependent features. These features are related to system performance.
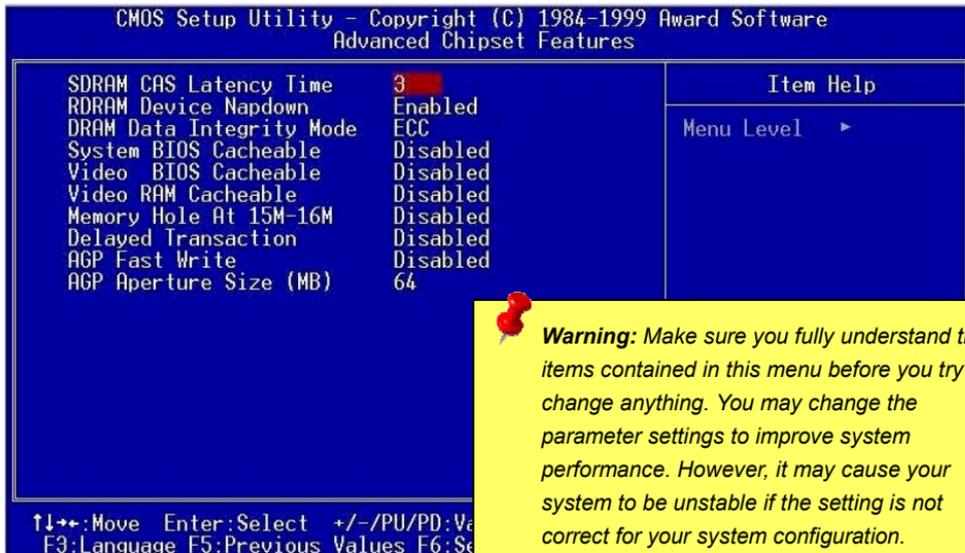
```
        CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                          Advanced Chipset Features

     SDRAM CAS Latency Time      3                        Item Help
     RDRAM Device Napdown        Enabled
     DRAM Data Integrity Mode    ECC               Menu Level    ▶
     System BIOS Cacheable       Disabled
     Video  BIOS Cacheable       Disabled
     Video RAM Cacheable         Disabled
     Memory Hole At 15M-16M      Disabled
     Delayed Transaction         Disabled
     AGP Fast Write              Disabled
     AGP Aperture Size (MB)      64


  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Va
    F3:Language F5:Previous Values F6:Se
```

> *Warning: Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance. However, it may cause your system to be unstable if the setting is not correct for your system configuration.*

AOpen

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Advanced Chipset Features > DRAM Data Integrity Mode

DRAM Data Integrity Mode
ECC
Non-ECC

This lets you enable or disable memory ECC function. The ECC algorithm has the ability to detect double bit error and automatically correct single bit error.

Advanced Chipset Features > System BIOS Cacheable

System BIOS Cacheable
Enable
Disable

Allows the system BIOS to be cached to allow faster system performance.

Advanced Chipset Features > Video BIOS Cacheable

Video BIOS Cacheable
Enabled
Disabled

Allows the video BIOS to be cached to allow faster video performance.

Advanced Chipset Features > Video RAM Cacheable

<u>Video RAM Cacheable</u>
Enabled
Disabled

This item lets you cache Video RAM A000 and B000.

Advanced Chipset Features > Memory Hole At 15M-16M

<u>Memory Hole At 15M-16M</u>
Enabled
Disabled

This option lets you reserve system memory area for special I/O cards. The chipset accesses code/data of these areas from the I/O bus directly. Normally, these areas are reserved for memory mapped I/O card.

Advanced Chipset Features > Delayed Transaction

<u>Delayed Transaction</u>
Enabled
Disabled

This item lets you control the Delayed Transaction function of the ICH. This function is used to meet latency of PCI cycles to or from ISA cycle.

Advanced Chipset Features > AGP Aperture Size (MB)

AGP Aperture Size (MB)
4, 8, 16, 32, 64, 128, 256

This item lets you determine the effective size of the AGP Graphic Aperture.

Integrated Peripherals

This submenu appears if you select the option "Integrated Peripherals" from the main menu.   This
option allows you to configure the I/O features.

```
        CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                           Integrated Peripherals
   On-Chip Primary   PCI IDE    Enabled      ▲          Item Help
   On-Chip Secondary PCI IDE    Enabled
   IDE Primary Master PIO       Auto                 Menu Level    ►
   IDE Primary Slave  PIO       Auto
   IDE Secondary Master PIO     Auto
   IDE Secondary Slave  PIO     Auto
   IDE Primary Master UDMA      Auto
   IDE Primary Slave  UDMA      Auto
   IDE Secondary Master UDMA    Auto
   IDE Secondary Slave  UDMA    Auto
   USB Controller               Enabled
   USB Keyboard Support         Disabled
   Init Display First           AGP
   AC97 Audio                   Auto
   AC97 Modem                   Auto
   IDE HDD Block Mode           Enabled
   POWER ON Function
   KB Power ON Password         Enter
   Hot Key Power ON             Ctrl-F1      ▼
  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

AOpen

This page is the lower half of Integrated Peripherals submenu.

```
            CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                              Integrated Peripherals

   POWER ON Function                                   ▲        Item Help
   KB Power ON Password          Enter
   Hot Key Power ON              Ctrl-F1                     Menu Level   ►
   Onboard FDC Controller        Enabled
   Onboard Serial Port 1         3F8/IRQ4
   Onboard Serial Port 2
   UART Mode Select
   RxD , TxD Active              Hi,Lo
   IR Transmission Delay         Enabled
   UR2 Duplex Mode               Full
   Use IR Pins                   IR-Rx2Tx2
   Onboard Parallel Port
   Parallel Port Mode
   EPP Mode Select               EPP1.9
   ECP Mode Use DMA              3
   PWRON After PWR-Fail          Off
   Game Port Address             201
   Midi Port Address             330
   Midi Port IRQ                 5                     ▼

   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F3:Language  F5:Previous Values  F6:Setup Defaults  F7:Turbo Defaults
```

Integrated Peripherals > On-Chip Primary PCI IDE

Integrated Peripherals > On-Chip Secondary PCI IDE

On-Chip Primary PCI IDE
Enabled
Disabled

This parameter lets you enable or disable the IDE device connected to the primary IDE connector.

Integrated Peripherals > IDE Primary Master PIO

Integrated Peripherals > IDE Primary Slave PIO

Integrated Peripherals > IDE Secondary Master PIO

Integrated Peripherals > IDE Secondary Slave PIO

IDE Primary Master PIO
Auto
Mode 1
Mode 2
Mode 3
Mode 4

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.

AOpen

Integrated Peripherals > IDE Primary Master UDMA

Integrated Peripherals > IDE Primary Slave UDMA

Integrated Peripherals > IDE Secondary Master UDMA

Integrated Peripherals > IDE Secondary Slave UDMA

IDE Primary Master UDMA
Auto
Disabled

This item allows you to set the ATA/66 mode supported by the hard disk drive connected to your primary IDE connector.

Integrated Peripherals > USB Controller

USB Controller
Enabled
Disabled

This item lets you enable or disable the USB controller.

Integrated Peripherals > USB Keyboard Support

USB Keyboard Support
Enabled
Disabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.

Note: You cannot use both USB driver and USB legacy keyboard at the same time. Disable "USB Keyboard Support" if you have USB driver in the operating system.

Integrated Peripherals > Init Display First

Init Display First
PCI Slot
AGP

If you installed a PCI VGA card, this item lets you decide which one is the initial display card.

AOpen

Integrated Peripherals > AC97 Audio

AC97 Audio
Auto
Disabled

This item is used to enable or disable the onboard audio.

Integrated Peripherals > AC97 Modem

AC97 Modem
Auto
Disabled

The item is used to enable or disable the AC97 modem. If disabled, an AMR modem card can't work properly.

Integrated Peripherals > IDE HDD Block Mode

IDE HDD Block Mode
Enabled
Disabled

This feature enhances disk performance by allowing multi-sector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.

Integrated Peripherals > Power On Function

| **Power On Function** |
| Any Key |
| Button Only |
| Keyboard 98 |
| Password |
| Hot Key |
| Mouse Left |
| Mouse Right |

This item is used to select Wake on Keyboard/Mouse mode.

Any Key: This function allows you wake up the system by clicking any key.

Button Only: Disable Wake on KB/MS function. You can boot up your system by power button only.

Keyboard 98: If selecting this option, you can boot up the system by power button and the "Wake" key on Keyboard 98.

Password: Disable the function of power button and let the system can only be powered on through the preset keys (like a password).

Hot Key: If selecting this option, you also need to specify the hot key from "Hot Key Power On" item.

Mouse Left: This function allows you wake up the system by clicking left mouse button twice successively.

Mouse Right: This function allows you wake up the system by clicking right mouse button twice successively.

Note:

- *Whenever you change this item, it will only take effect after you restart the system and successfully boot the Windows or DOS.*

- *To implement Wake on Keyboard/Mouse function, you must set JP28 to Enabled.*

- *Wake on Mouse function applies to PS/2 mouse only.*

- *If you set a password but forget it, please clear CMOS.*

- *If you want to use Wake on Mouse function in DOS, it is necessary to install the DOS driver of the mouse.*

Integrated Peripherals > KB Power On Password

KB Power On Password

You can specify 1-5 keys as a password.

Integrated Peripherals > Hot Key Power On

Hot Key Power On

Ctrl-F1, Ctrl-F2, Ctrl-F3,
Ctrl-F4, Ctrl-F5, Ctrl-F6,
Ctrl-F7, Ctrl-F8, Ctrl-F9,
Ctrl-F10, Ctrl-F11,
Ctrl-F12

If you select "Hot Key" option in "Power On Function" Item, you need to specify a hot key here.

Integrated Peripherals > Onboard FDC Controller

Onboard FDC Controller

Enabled

Disabled

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card.   Change the setting to Disabled if you want to use a separate controller card.

Integrated Peripherals > Onboard Serial Port 1

Integrated Peripherals > Onboard Serial Port 2

Onboard Serial Port 1
Auto
3F8/IRQ4
2F8/IRQ3
3E8/IRQ4
2E8/IRQ3
Disabled

This item allows you to assign address and interrupt for the board serial port.   Default is **Auto**.

> *Note: If you are using network card, make sure that the IRQ do not conflict.*

A Open

Integrated Peripherals > UART Mode Select

| **UART Mode Select** |
| IrDA |
| ASKIR |
| Normal |

This item is configurable only if the "Onboard Serial Port 2" is enabled.   This allows you to specify the mode of serial port2.   The available mode selections are:

Normal

Sets serial port 2 to operate in normal mode. This is the default setting.

IrDA (SIR)

This setting allows infrared serial communication at a maximum baud rate of 115.2K baud.

ASKIR

This setting allows infrared serial communication at a maximum baud rate of 57.6K baud.

Integrated Peripherals > RxD, TxD Active

RxD, TxD Active
Hi, Hi
Hi, Lo,
Lo, Hi
Lo, Lo

This item is used to select RxD (Receive Data) and TxD (Transmit Data) mode for UART, for instance, IR device, modem, etc. Normally, we suggest you keep the default setting. Please see the documentation that comes with your device.

Integrated Peripherals > IR Transmission Delay

IR Transmission Delay
Enabled
Disabled

If Enabled is selected, there will be a 4 character delay when SIR is changed from TX mode to RX mode.

Integrated Peripherals > Onboard Parallel Port

Onboard Parallel Port
3BC/IRQ7
378/IRQ7
278/IRQ5
Disabled

This item controls the onboard parallel port address and interrupt.

A Open

Note: If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.

Integrated Peripherals > Parallel Port Mode

Parallel Port Mode
SPP, EPP, ECP,
ECP + EPP

This item lets you set the parallel port mode.   The mode options are SPP (Standard and Bidirection Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port).

SPP (Standard and Bidirection Parallel Port)

SPP is the IBM AT and PS/2 compatible mode.

EPP (Enhanced Parallel Port)

EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch.

ECP (Extended Parallel Port)

ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

Integrated Peripherals > EPP Mode Select

EPP Mode Select
EPP1.7
EPP1.9

This item lets you select EPP mode protocol.

Integrated Peripherals > ECP Mode Use DMA

ECP Mode Use DMA
3
1

This item lets you set the DMA channel of ECP mode.

Integrated Peripherals > AC PWR Auto Recovery

| **AC PWR Auto Recovery** |
| Former-Sts |
| On |
| Off |

A traditional ATX system should remain at power off stage when AC power resumes from power failure. This design is inconvenient for a network server or workstation, without an UPS, that needs to keep power-on. This item is used to solve this problem. Selecting On enabling system to automatically power-on after AC power resumes; in the other hand, the system will remain power-off if you select Off. If Former-Sts (former status) option is selected, the system will power-on or power-off based on the original state.

Integrated Peripherals > Game Port Address

| **Game Port Address** |
| Disabled |
| 201 |
| 209 |

This item is used to assign an address for the Game port.

Integrated Peripherals > MIDI Port Address

MIDI Port Address
Disabled
330
300
290

This item is used to assign an address for the MIDI port.

Integrated Peripherals > MIDI Port IRQ

MIDI Port IRQ
5
7

This item is used to assign an IRQ for the MIDI port.

Power Management Setup

The Power Management Setup screen enables you to control the motherboard green features.
See the following screen.

```
         CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                           Power Management Setup
 ┌─────────────────────────────────────────────────┬───────────────────────┐
 │  ACPI Function              Enabled            ▲ │       Item Help       │
 │  ACPI Suspend Type          S1                   │                       │
 │  Power Management           User Define          │  Menu Level    ►      │
 │  Video Off Method           V/H SYNC+Blank       │                       │
 │  Video Off In Suspend       Yes                  │                       │
 │  Suspend Type               PwrOn Suspend        │                       │
 │  MODEM Use IRQ              3                     │                       │
 │  Suspend Mode               Disabled             │                       │
 │  HDD Power Down             Disabled             │                       │
 │  Soft-Off by PWR-BTTN       Instant-Off          │                       │
 │  0V Wake On Modem           Disabled             │                       │
 │  Wake On LAN                Disabled             │                       │
 │  Wake On RTC Timer          Disabled             │                       │
 │ x Date(of Month) Alarm          0                │                       │
 │ x Time(hh:mm:ss) Alarm       0  :  0:   0        │                       │
 │                                                  │                       │
 │  ** Reload Global Timer Events **                │                       │
 │  Primary IDE 0              Disabled             │                       │
 │  Primary IDE 1              Disabled           ▼ │                       │
 └─────────────────────────────────────────────────┴───────────────────────┘
  ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F3:Language  F5:Previous Values  F6:Setup Defaults  F7:Turbo Defaults
```

AOpen

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This page is the lower half of Power Management submenu.

```
            CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                              Power Management Setup
   ┌────────────────────────────────────────────────┬──────────────────────┐
   │  Video Off In Suspend        Yes            ▲   │      Item Help       │
   │  Suspend Type                PwrOn Suspend      │                      │
   │  MODEM Use IRQ               3                  │   Menu Level    ►    │
   │  Suspend Mode                Disabled           │                      │
   │  HDD Power Down              Disabled           │                      │
   │  Soft-Off by PWR-BTTN        Instant-Off        │                      │
   │  0V Wake On Modem            Disabled           │                      │
   │  Wake On LAN                 Disabled           │                      │
   │  Wake On RTC Timer           Disabled           │                      │
   │ x Date(of Month) Alarm       0                  │                      │
   │ x Time(hh:mm:ss) Alarm       0  :  0:  0        │                      │
   │                                                 │                      │
   │  ** Reload Global Timer Events **               │                      │
   │  Primary IDE 0               Disabled           │                      │
   │  Primary IDE 1               Disabled           │                      │
   │  Secondary IDE 0             Disabled           │                      │
   │  Secondary IDE 1             Disabled           │                      │
   │  FDD,COM,LPT Port            Disabled           │                      │
   │  PCI PIRQ[A-D]#              Disabled       ▼   │                      │
   └────────────────────────────────────────────────┴──────────────────────┘
   ↑↓←→:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

A Open

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Power Management > ACPI Function

| **ACPI Function** |
| Enabled |
| Disabled |

If your OS is ACPI enabled you have to set this item to Enabled, or there may be unexpected errors. If your OS is APM mode, you can remain the Disabled setting.

Power Management > ACPI Suspend Type

| **ACPI Suspend Type** |
| S1 |
| S3 |

This function allows you to select suspend types. S1 is Power On Suspend and S3 is Suspend to RAM.

Power Management > Power Management

| **Power Management** |
| Max Saving |
| Mix Saving |
| User Define |

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off the power management function. Set to User Define to choose your own parameters.

Mode	Suspend	HDD Power Down
Min Saving	1 hour	15 min
Max Saving	1 min	1 min

Power Management > Video Off Method

Video Off Method
V/H SYNC + Blank
DPMS
Blank Screen

This determines the way that the monitor is off. Blank Screen writes blanks to video buffer. V/H SYNC + Blank allows BIOS to control VSYNC and HSYNC signals. This function applies only for DPMS (Display Power Management Standard) monitor. The DPMS mode uses DPMS functions provided by the VGA card.

Power Management > Video Off In Suspend

Video Off In Suspend
No
Yes

The item is used to decide whether the video is off in the suspend mode.

Power Management > Suspend Type

Suspend Type
PWR On Suspend
CPU Sleep Mode

You can select APM suspend mode by this item. If **PWR On Suspend** is selected, the CPU clock will be stopped and all other devices are shut off. But power must be kept On to detect activities from modem, keyboard/mouse and returns the system to full power. The system activities are detected by monitoring the IRQ signals or I/O. **CPU Sleep Mode** is similar as above but CPU will go into deep sleep mode and save more power.

Power Management > Modem Use IRQ

Modem Use IRQ
3, 4, 5, 7, 9, 10, 11, N/A

This item lets you set an IRQ for the modem.

A Open

Power Management > Suspend Mode

<u>Suspend Mode</u>

Disabled, 1 Min, 2 Min,

4 Min., 8 Min, 12 Min,

20 Min, 30 Min, 40 Min,

1 Hour

This item lets you set the period of time after which the system enters into Suspend mode. The Suspend mode can be Power On Suspend or Suspend to Hard Drive, selected by "Suspend Type".

Power Management > HDD Power Down

<u>HDD Power Down</u>

Disabled, 1 Min, ...,

15 Min

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states previously described in this section (Standby and Suspend).

Power Management > Soft-Off by PWR-BTTN

Soft-Off by PWR-BTTN
Delay 4 sec.
Instant-Off

This is a specification of ACPI and supported by hardware. When **Delay 4 sec.** is selected, the soft power switch on the front panel can be used to control power On, Suspend and Off. If the switch is pressed for less than 4 seconds during power On, the system will go into Suspend mode. If the switch is pressed for longer than 4 seconds, the system will be turned Off. The default setting is **Instant-Off**. If **Instant-Off** is selected the soft power switch is only used to control On and Off, so there is no need to press it for 4 seconds, and there is no Suspend.

Power Management > Wake On PCI Card

Wake On PCI Card
Enabled
Disabled

This is a function of PCI specification 2.2. PCI bus supports standby current to PCI card and PCI card can wakeup system if it detects certain activity.

Power Management > Wake On Modem

Wake On Modem
Enabled
Disabled

This option lets you specify enable or disable Wake On Modem function.

Power Management > Wake On LAN

Wake On LAN
Enabled
Disabled

This option lets you specify enable or disable Wake On LAN function.

Power Management > Wake On RTC Timer

Wake On RTC Timer
By Date
By Week
Disabled

The Wake Up Timer is more like an alarm, which wakes up and powers on your system at a pre-defined time for a specific application. It can be set to wake up everyday or on specific date within a month. The date/time is accurate to within a second. This option lets you enable or disable the RTC Wake Up function.

AOpen

Power Management > Date (of Month)

Date (of Month)
0, 1, ..., 31

This item is displayed when you enable the Wake On RTC Timer option. Here you can specify what date you want to wake up the system. For Example, setting to 15 will wake up the system on the 15th day of every month.

Tip: Setting this item to 0 will wake up the system on the specified time (which can be set in the Wake On RTC Timer) every day.

Power Management > Time (hh:mm:ss)

Time (hh:mm:ss)
hh:mm:ss

This item is displayed when you enable the Wake On RTC Timer option. Here you can specify what time you want to wake up the system.

AOpen

Power Management > Primary IDE 0

Power Management > Primary IDE 1

Power Management > Secondary IDE 0

Power Management > Secondary IDE 1

Power Management > FDD, COM, LPT Port

Power Management > PCI PIRQ [A-D] #
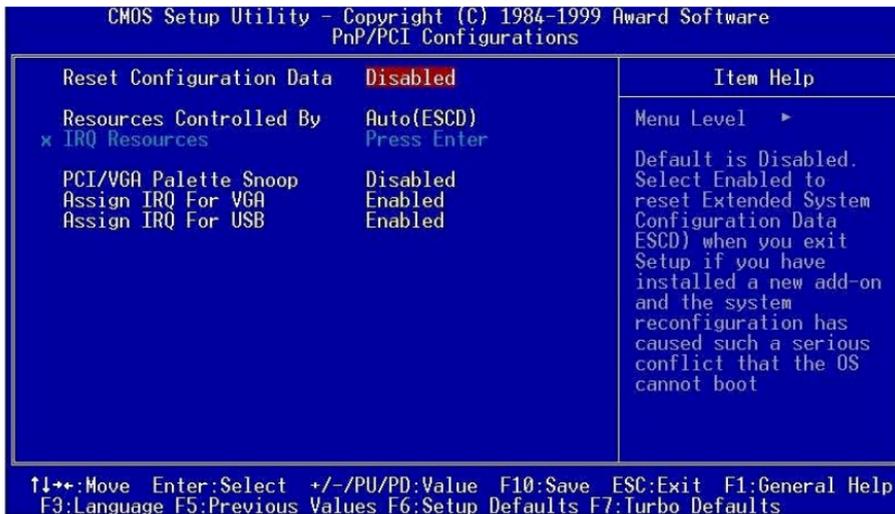
Primary IDE 0
Enabled
Disabled

These items enable or disable the detection of IDE, floppy, serial, parallel and PCI IRQ activities for power down state transition.

PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.

```
          CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                              PnP/PCI Configurations

     Reset Configuration Data    Disabled              |        Item Help

     Resources Controlled By     Auto(ESCD)           Menu Level    ▶
   x IRQ Resources               Press Enter
                                                      Default is Disabled.
     PCI/VGA Palette Snoop       Disabled             Select Enabled to
     Assign IRQ For VGA          Enabled              reset Extended System
     Assign IRQ For USB          Enabled              Configuration Data
                                                      ESCD) when you exit
                                                      Setup if you have
                                                      installed a new add-on
                                                      and the system
                                                      reconfiguration has
                                                      caused such a serious
                                                      conflict that the OS
                                                      cannot boot

   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

PNP/PCI Configuration > Reset Configuration Data

Reset Configuration Data
Enabled
Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs, DMAs, and I/O address.

PNP/PCI Configuration > Resources Controlled By

Resources Controlled by
Auto
Manual

Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to **Auto** to enable the auto-configuration function.

PNP/PCI Configuration > IRQ Resources

| **IRQ 3** |
| Reserved |
| PnP |

If your device is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to **Reserved**. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy device. The default is **PnP**. Note that PCI cards are always PnP compatible (except old PCI IDE card).

The available IRQs are: IRQ3 (COM2), IRQ4 (COM1), IRQ5 (Network/Sound or Others), IRQ7 (Printer or Others), IRQ9 (Video or Others), IRQ10 (SCSI or Others), IRQ11 (SCSI or Others), IRQ12 (PS/2 Mouse), IRQ14 (IDE1), IRQ15 (IDE2).

PNP/PCI Configuration > PCI/VGA Palette Snoop

PCI/VGA Palette Snoop

Enabled

Disabled

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

PNP/PCI Configuration > Assign IRQ For VGA
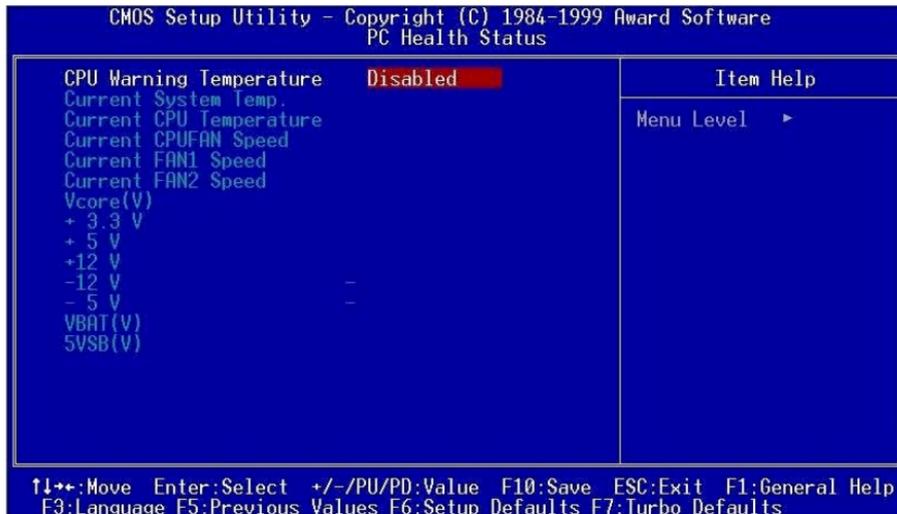
Assign IRQ For VGA

Enabled

Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs, DMAs, and I/O address.

A Open

PNP/PCI Configuration > Assign IRQ For USB

Assign IRQ For USB
Enabled
Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs, DMAs, and I/O address.

PC Health Status

This submenu displays hardware monitor status and provide some basic control function. You can install Hardware Monitoring utility without using setup items in this submenu.

```
CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                        PC Health Status

  CPU Warning Temperature      Disabled              Item Help
  Current System Temp.
  Current CPU Temperature                      Menu Level    ▶
  Current CPUFAN Speed
  Current FAN1 Speed
  Current FAN2 Speed
  Vcore(V)
  + 3.3 V
  + 5 V
  +12 V
  -12 V
  - 5 V
  VBAT(V)
  5VSB(V)


↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
  F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

A Open

PC Health Status > CPU Warning Temperature

CPU Warning Temperature
Disabled
50°C / 122°F
53°C / 127°F
56°C / 133°F
60°C / 140°F
63°C / 145°F
66°C / 157°F
70°C / 158°F

This item is used to specify a CPU warning temperature. When the CPU's temperature is higher than this predefined value, the CPU's speed will automatically slow down and there will be a warning from BIOS.

Frequency Control

This submenu allows you to configure the CPU and memory clock.

```
         CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
                           Frequency/Voltage Control

   Clock Spread Spectrum      Disabled                      Item Help
   CPU Speed Detected              0
   CPU Speed Setting          100  x3.5 =   350.0    Menu Level    ▶
   RDRAM Speed                100  x6.0 =   600  MB/s
                                                     1. If CPU speed
                                                     detected does not
                                                     match the CPU speed
                                                     setup. It is probably
                                                     caused by the CPU has
                                                     a fixed FSB clock or
                                                     fixed clock ratio.

                                                     2. If you fail to
                                                     reboot the system,
                                                     please press <Home>
                                                     key first and then
                                                     press Reset button at
                                                     the same time.


   ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
   F3:Language F5:Previous Values F6:Setup Defaults F7:Turbo Defaults
```

Frequency Control > Clock Spread Spectrum

Clock Spread Spectrum

Enable

Disable

This item is used to set clock spread spectrum for EMI testing. Normally, you don't need to change the default setting.

Frequency Control > CPU Speed Setting

CPU Speed Setting

FSB clock:

100, 105, 114, 120, 124, 128.5, 133.3, 133.9, 138, 143, 148, 152.5, 155, and 160 MHz.

Clock Ratio:

x2, x2.5, x 3, x 3.5, x 4,

x 4.5, x 5, x 5.5, x 6,

x 6.5, x 7, x 7.5, and x8

The item is used to select the CPU clock speed.

CPU Clock = FSB clock x Clock Ratio..

Frequency Control > RDRAM Speed

<u>RDRAM Speed</u>

Clock Ratio:
x4, x5.33, x6, x8

This item is used to select the RDRAM speed.

RDRAM Speed = FSB clock x RDRAM Clock Ratio

Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. **All the product verification, compatibility/reliability test report and manufacture quality control are based on "Load Setup Defaults".** We recommend to use this settings for normal operation. "Load Setup Defaults" is not the slowest setting for this motherboard. If you need to verify an unstable problem, you may manually set the parameter in the "Advanced BIOS Features" and "Advanced Chipset Features" to get slowest and safer setting.

```
      CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
 ▶ Standard CMOS Features              Load Setup Defaults
 ▶ Advanced BIOS Features              Load Turbo Defaults
 ▶ Advanced Chipset Features           Set Password
 ▶ Integrated Peripherals              Save & Exit Setup
 ▶ Power Management Setup              Exit Without Saving
 ▶ PnP/PCI Configurations              Load EEPROM Defaults
 ▶ PC Health Status                    Save EEPROM Defaults
 ▶ Frequency/Voltage Control
 Esc : Quit       F9 : Menu in BIOS    ↑↓→← : Select Item
 F10 : Save & Exit Setup               <Shift>F3 : Change Language

               Time, Date, Hard Disk Type...
```

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Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than "Load Setup Defaults". It is provided for the convenience of power user who wants to push the motherboard to get better performance. Turbo setting does not go though all the detail reliability and compatibility test, it is tested only with limited configuration and loading (for example, a system that contains only a VGA card and one DIMM/RIMM). **Use Turbo setting only when you fully understand the items in Chipset Setup menu.** The performance improvement of Turbo setting is normally around 3% to 5%, depending on the chipset and the application.

Set Password

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1.   At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.

2.   After typing the password, press.

3.   At the next prompt, re-type your password and press again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press when prompted to enter the password.   The screen displays a message confirming that the password has been disabled.

Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.

```
       CMOS Setup Utility - Copyright (C) 1984-1999 Award Software
  ▶ Standard CMOS Features          Load Setup Defaults
  ▶ Advanced BIOS Features          Load Turbo Defaults
  ▶ Advanced Chipset Features       Set Password
  ▶ Integrated Peripherals          Save & Exit Setup
  ▶ Power Management Setup           Exit Without Saving
  ▶ PnP/PCI Configurations          Load EEPROM Defaults
  ▶ PC Health Status                Save EEPROM Defaults
  ▶ Frequency/Voltage Control
  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup                (Shift)F3 : Change Language

                   Time, Date, Hard Disk Type...
```

Exit without Saving

Use this function to exit Setup without saving the CMOS value changes.   Do not use this option if you want to save the new configuration.

Load EEPROM Default

Except "Load Setup Default" and "Load Turbo Default", you may also use "Save EEPROM Default " to save your own settings into EEPROM, and reload by using this item.

Save EEPROM Default

You may use this item to save your own settings into EEPROM. Then, if the data in CMOS is lost or you forget the previous settings, you may use "Load EEPROM Default " to reload.

NCR SCSI BIOS and Drivers

Due to Flash ROM space limitation, some BIOS versions do not include NCR 53C810 SCSI BIOS (supports DOS, Windows 3.1 and OS/2) into the system BIOS. Many SCSI cards have its own SCSI BIOS on card, for better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

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BIOS Upgrade

AOpen Easy Flash is a little different than traditional flash method. The BIOS binary file and flash routine are linked together and you simply run a single commend to complete the flash process.

1. Download new BIOS upgrade zipped file from AOpen's web site. For example, AX6C100.ZIP.

2. Unzip it and we recommend to save into a bootable DOS floppy diskette for error recovery.

3. Reboot the system to DOS mode without loading any memory handler (such as EMM386) or device driver. It needs around 520K free memory space.

4. Execute   A:> AX6BC100

   DO NOT turn off the power during FLASH PROCESS.

`Del`

5. Reboot system and press <Del> to enter BIOS setup, Choose "Load Setup Defaults", then "Save & Exit Setup". Done!

Warning: *The upgrade of new BIOS will permanently replace your original BIOS content after flashing. The original BIOS setting and Win95/Win98 PnP information will be refreshed and you probably need to re-configure your system.*

> *Tip:* *If you prefer to use EPROM writer, you can find BIOS BIN file after unzip.*

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Overclocking

As a leading manufacturer in motherboard industry, AOpen always listens to what customers want and develop products to fit different user's requirements. Reliability, compatibility, leading technology and friendly features are our basic goals when designing motherboards. Other than above mentioned design criteria, there are power users who are always seeking to push the limitation of the system performance by overclocking which we call them "Overclocker".

This section is dedicated to Overclockers.

This high performance motherboard is designed for maximum **133MHz** CPU bus clock. But it comes with clock generator of **160MHz** when we design it to accommodate future CPU bus clock. Our lab test results shown that **160MHz** is achievable when proper setting and qualified components were presented.

Warning: *The design of this product follows CPU and chipset vendor's design guideline. Any attempts to push beyond product specification are not recommended and you are taking your own risk to damage your system or important data. Before doing overclocking, you must make sure your components are able to tolerate such abnormal setting, especially CPU, memory, hard disks, and AGP VGA cards.*

Tip: *Note that overclocking may also cause thermal problem. Please make sure that the cooling fan and the heatsink were adequate to dissipate excessive heat that's generated by overclocking the CPU.*

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Recommended Overclocking Settings

For your reference, the following configurations are what we feel comfortable in our lab,

But not guaranty. ☺

CPU	Pentium II 400
Memory	Apacer RAMBUS 800 (128M)
HDD	Quantum Fire Ball CX 6.4Gbyte
VGA	AOpen PA-2010 16M (Voodoo Banshee)
CDROM	AOpen 940E 40X CDROM
BIOS	Rev 1.0 (Load BIOS Setup Default)
OS	Windows 98 SE

The test result:

CPU Speed (MHz)	RDRAM Speed (MB/s)	Business Winstone 99
100 x 4 = 400	100 x 8 = 800	21.5
105 x 4 = 420	105 x 6 = 630	21.7
114 x 4 = 456	114 x 6 = 684	22.8
120 x 4 = 480	120 x 6 = 720	23.7
124 x 4 = 496	124 x 6 = 744	24.2
128.5 x 3.5 = 449.7	128.5 x 6 = 771	22.8
133.3 x 3.5 = 466.5	133.3 x 6 = 799.8	23.4
133.9 x 3.5 = 468.6	133.9 x 6 = 803.4	23.5
138 x 3.5 = 483	138 x 5.33 = 735.5	23.5
143 x 3.5 = 500.5	143 x 5.33 = 762.1	24.2

148 x 3 = 444	148 x 5.33 = 788.8	22.5
150 x 3 = 450	150 x 5.33 = 799.5	22.6
152.5 x 3 = 457.5	152.5 x 5.33 = 812.8	23.6
155 x 3 = 465	155 x 5.33 = 826.1	23.3
160 x 3 = 480	160 x 5.33 = 640	23.4

VGA and HDD

VGA and HDD are key components for overclocking, following list are what have been tested in our lab. Please note that AOpen can not guaranty they can be successful overclocked again.

VGA: http://www.aopen.com.tw/tech/report/overclk/mb/vga-oc.htm

HDD: http://www.aopen.com.tw/tech/report/overclk/mb/hdd-oc.htm

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Glossary

AC97

Basically, AC97 specification separates sound/modem circuit to two parts, digital processor and a CDDEC for analog I/O, they are linked by AC97 link bus. Since digital processor can be put into motherboard main chipset, the cost of sound/modem onboard solution can be reduced.

ACPI (Advanced Configuration & Power Interface)

ACPI is the power management specification of PC97 (1997). It intends to save more power by taking full control of power management to operating system and bypass BIOS. The chipset or super I/O chip needs to provide standard register interface to operating system (such as Windows 98). This is a bit similar as the PnP register interface. ACPI defines ATX momentary soft power switch to control the power state transition.

AGP (Accelerated Graphic Port)

AGP is a bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. AGP uses both rising and falling edge of the 66MHz clock, for 2X AGP, the data transfer rate is 66MHz x 4byte x 2 = 528MB/s. AGP is now moving to 4X mode, 66MHz x 4byte x 4 = 1056MB/s. AOpen is the first company to

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support 4X AGP motherboards by both AX6C (Intel 820) and MX64/AX64 (VIA 694x), started from Oct 1999.

AMR (Audio/Modem Riser)

The CODEC circuit of AC97 sound/modem solution can be put on motherboard or put on a riser card (AMR card) that connects to motherboard through AMR connector.

AOpen Bonus Pack CD

A disc bundled with AOpen motherboard product, there are motherboard drivers, Acrobat Reader for PDF online manual and other useful utilities.

APM

Unlike ACPI, BIOS controls most APM power management functions. AOpen Suspend to Hard Drive is a good example of APM power management.

ATA/66

ATA/66 uses both rising edge and falling edge as UDMA/33, but reduces the cycle time to 2 clocks, that is 60ns. The data transfer rate is (1/60ns) x 2 bytes x 2 = 66MB/s. To use ATA/66, you need special 80-wire ATA/66 IDE cable.

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ATA/100

ATA/100 is a new IDE specification under developing. ATA/100 uses both rising edge and falling edge as ATA/66 but clock cycle time is reduced to 40ns. The data transfer rate is (1/40ns) x 2 bytes x 2 = 100MB/s. To use ATA/100, you need special 80-wire IDE cable, the same as ATA/66.

BIOS (Basic Input/Output System)

BIOS is a set of assembly routine/program that reside in EPROM or Flash ROM. BIOS controls Input/output devices and other hardware devices of motherboard. In general, to provide hardware independent portability, operation system and drivers is required to access BIOS without directly access hardware devices.

Bus Master IDE (DMA mode)

The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode.

CODEC (Coding and Decoding)

Normally, CODEC means a circuit that can do digital to analog conversion and also the analog to digital conversion. It is part of AC97 sound/modem solution.

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DIMM (Dual In Line Memory Module)

DIMM socket has total 168-pin and supports 64-bit data. It can be single or double side, the golden finger signals on each side of PCB are different, that is why it was called Dual In Line. Almost all DIMMs are made by SDRAM, which operate at 3.3V. Note that some old DIMMs are made by FPM/EDO and only operate at 5V. Do not confuse them with SDRAM DIMM..

ECC (Error Checking and Correction)

The ECC mode needs 8 ECC bits for 64-bit data. Each time memory is accessed, ECC bits are updated and checked by a special algorithm. The ECC algorithm has the ability to detect double-bit error and automatically correct single-bit error while parity mode can only detect single-bit error.

EDO (Extended Data Output) Memory

The EDO DRAM technology is actually very similar to FPM (Fast Page Mode). Unlike traditional FPM that tri-states the memory output data to start the pre-charge activity, EDO DRAM holds the memory data valid until the next memory access cycle, that is similar to pipeline effect and reduces one clock state.

EEPROM (Electronic Erasable Programmable ROM)

Also known as E^2PROM. Both EEPROM and Flash ROM can be re-programmed by electronic signals, but the interface technology is different. Size of EEPROM is much smaller than flash ROM, AOpen motherboard uses EEPROM for jumper-less and battery-less design.

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EPROM (Erasable Programmable ROM)

Traditional motherboard stores BIOS code in EPROM. EPROM can only be erased by ultra-violet (UV) light. If BIOS has to be upgraded, you need to remove EPROM from motherboard, clear by UV light, re-program, and then insert back.

FCC DoC (Declaration of Conformity)

The DoC is component certification standard of FCC EMI regulations. This standard allows DIY component (such as motherboard) to apply DoC label separately without a shielding of housing.

Flash ROM

Flash ROM can be re-programmed by electronic signals. It is easier for BIOS to upgrade by a flash utility, but it is also easier to be infected by virus. Because of increase of new functions, BIOS size is increased from 64KB to 256KB (2M bit). AOpen AX5T is the first board to implement 256KB (2Mbit) Flash ROM. Now flash ROM size is moving to 4M bit on AX6C (Intel 820) and MX3W (Intel 810) motherboard.

FSB (Front Side Bus) Clock

FSB Clock means CPU external bus clock.

CPU internal clock = CPU FSB Clock x CPU Clock Ratio

I2C Bus

See SMBus.

P1394

P1394 (IEEE 1394) is a standard of high-speed serial peripheral bus. Unlike low or medium speed USB, P1394 supports 50 to 1000Mbit/s and can be used for video camera, disk and LAN.

PBSRAM (Pipelined Burst SRAM)

For Socket 7 CPU, one burst data read requires four QWord (Quad-word, 4x16 = 64 bits). PBSRAM only needs one address decoding time and automatically sends the remaining QWords to CPU according to a predefined sequence. Normally, it is 3-1-1-1, total 6 clocks, which is faster than asynchronous SRAM. PBSRAM is often used on L2 (level 2) cache of Socket 7 CPU. Slot 1 and Socket 370 CPU do not need PBSRAM.

PC100 DIMM

SDRAM DIMM that supports 100MHz CPU FSB bus clock.

PC133 DIMM

SDRAM DIMM that supports 133MHz CPU FSB bus clock.

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PDF Format

A file format for electronic document, PDF format is independent from platform, you can read PDF file under Windows, Unix, Linux, Mac … with different PDF reader. You can also read PDF file by web browser such as IE and Netscape, note that you need to install PDF plug-in first (Included in Acrobat Reader).

PnP (Plug and Play)

The PnP specification suggests a standard register interface for both BIOS and operating system (such as Windows 95). These registers are used by BIOS and operating system to configure system resource and prevent any conflicts. The IRQ/DMA/Memory will be automatically allocated by PnP BIOS or operating system. Currently, almost all the PCI cards and most ISA cards are already PnP compliant.

POST (Power-On Self Test)

The BIOS self test procedure after power-on, sometimes, it is the first or the second screen shown on your monitor during system boot.

RDRAM (Rambus DRAM)

Rambus is a memory technology that uses large burst mode data transfer. Theoretically, the data transfer should be high than SDRAM. RDRAM is cascaded in channel operation. For Intel 820, only one RDRAM channel is supported, 16-bit data per channel, and this channel may have maximum

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32 RDRAM devices, no matter how many RIMM sockets.

RIMM

184-pin memory module that supports RDRAM memory technology. A RIMM memory module may contain up to maximum of 16 RDRAM devices.

SDRAM (Synchronous DRAM)

SDRAM is one of the DRAM technologies that allows DRAM to use the same clock as the CPU host bus (EDO and FPM are asynchronous and do not have clock signal). It is similar as PBSRAM to use burst mode transfer. SDRAM comes in 64-bit 168-pin DIMM and operates at 3.3V. AOpen is the first company to support dual-SDRAM DIMMs onboard (AP5V), from Q1 1996

SIMM (Single In Line Memory Module)

SIMM socket is only 72-pin, and is only single side. The golden finger signals on each side of PCB are identical. That is why it was called Single In Line. SIMM is made by FPM or EDO DRAM and supports 32-bit data. SIMM had been phased out on current motherboard design.

SMBus (System Management Bus)

SMBus is also called I2C bus. It is a two-wire bus developed for component communication (especially for semiconductor IC). For example, set clock of clock generator for jumper-less motherboard. The data transfer rate of SMBus is only 100Kbit/s, it allows one host to communicate

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with CPU and many masters and slaves to send/receive message.

SPD (Serial Presence Detect)

SPD is a small ROM or [EEPROM](#) device resided on the [DIMM](#) or [RIMM](#). SPD stores memory module information such as DRAM timing and chip parameters. SPD can be used by [BIOS](#) to decide best timing for this DIMM or RIMM.

Ultra DMA/33

Unlike traditional PIO/DMA mode, which only uses the rising edge of IDE command signal to transfer data. UDMA/33 uses both rising edge and falling edge, the data transfer rate is double of the PIO mode 4 or DMA mode 2.

16.6MB/s x2 = 33MB/s
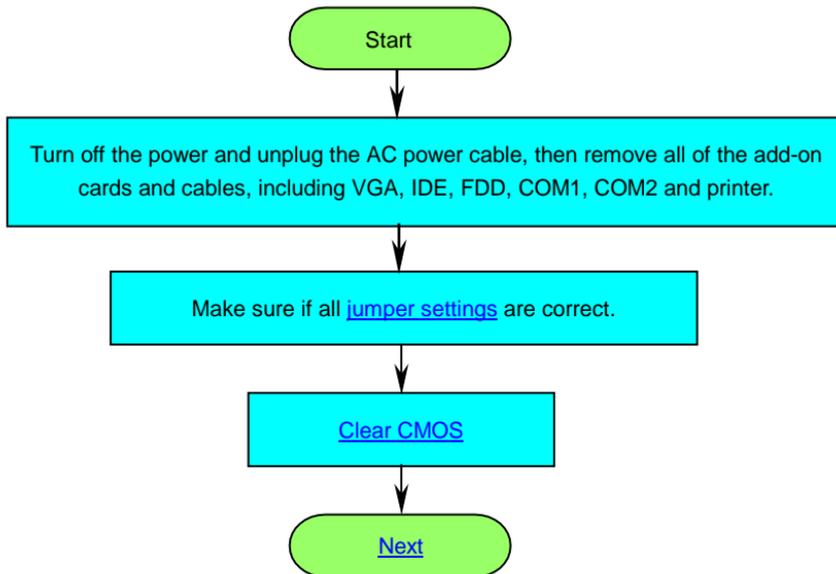
USB (Universal Serial Bus)

USB is a 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem. With USB, the traditional complex cables from back panel of your PC can be eliminated.
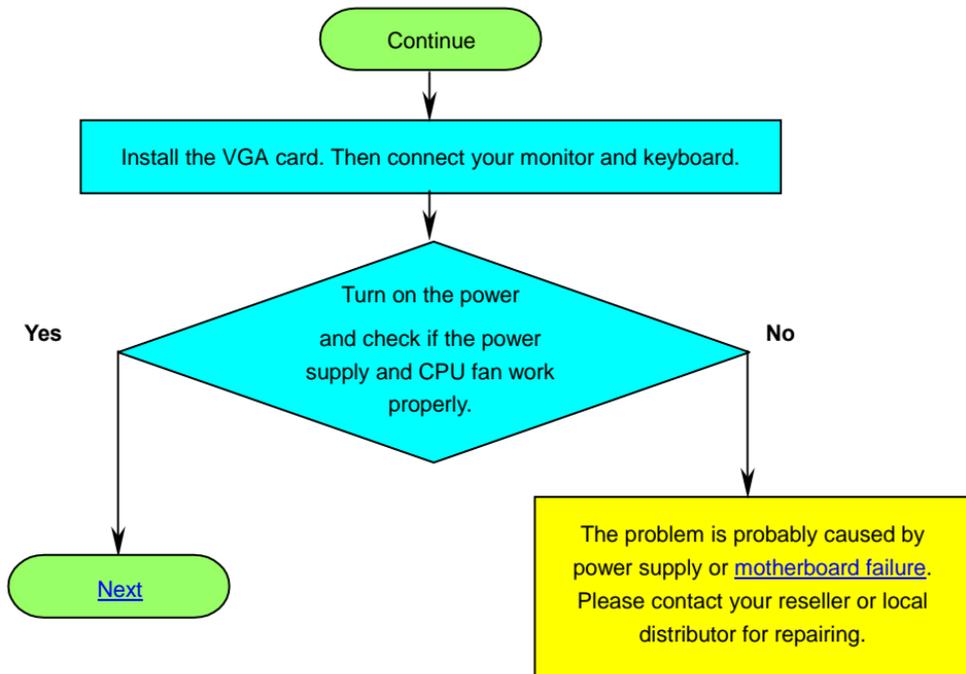
A Open
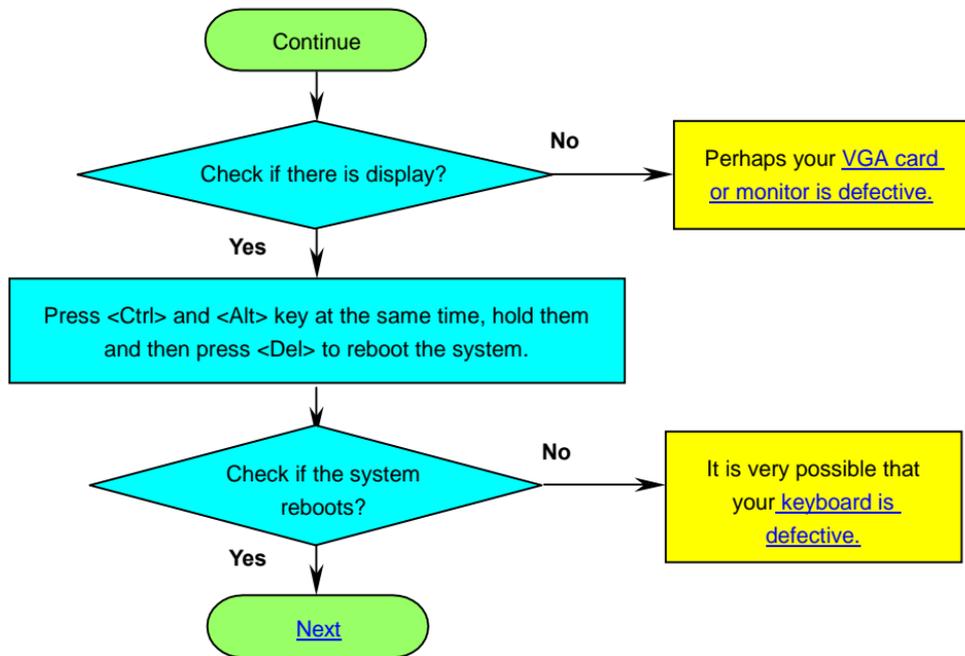
ZIP file

A compressed file format to reduce file size. To unzip file, run shareware PKUNZIP (http://www.pkware.com/) for DOS and other operating system or WINZIP (http://www.winzip.com/) for windows environment.

Troubleshooting

Start

Turn off the power and unplug the AC power cable, then remove all of the add-on cards and cables, including VGA, IDE, FDD, COM1, COM2 and printer.

Make sure if all jumper settings are correct.

Clear CMOS

Next

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Continue

Install the VGA card. Then connect your monitor and keyboard.

Turn on the power and check if the power supply and CPU fan work properly.

Yes

No

The problem is probably caused by power supply or motherboard failure. Please contact your reseller or local distributor for repairing.

Next

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Continue

Check if there is display? — **No** → Perhaps your VGA card or monitor is defective.

Yes

Press <Ctrl> and <Alt> key at the same time, hold them and then press <Del> to reboot the system.

Check if the system reboots? — **No** → It is very possible that your keyboard is defective.

Yes

Next

Continue

During system rebooting, press <Del> to enter BIOS setup. Choose "Load Setup Default".

Turn off the system and re-connect IDE cable.

Check if the system can reboot successfully?

No → The problem should be caused by the IDE cable or HDD itself.

Yes

Re-install operatiing system such as Windows 98.

End

Technical Support

Dear Customer,

Thanks for choosing AOpen products. To provide the best and fastest service to our customer is our first priority. However, we receive numerous emails and phone-calls worldwide everyday, it is very hard for us to serve everyone on time. We recommend you follow the procedures below and seek help before contact us. With your help, we can then continue to provide the best quality service to more customers.

Thanks very much for your understanding!

AOpen Technical Supporting Team

1	**Online Manual:** Please check the manual carefully and make sure the jumper settings and installation procedure are correct. http://www.aopen.com.tw/tech/download/manual/default.htm

2	**Test Report:** We recommend to choose board/card/device from the compatibility test reports for assembling your PC. http://www.aopen.com.tw/tech/report/default.htm

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3 **FAQ:** The latest FAQ   (Frequently Asked Questions) may contain a solution to your problem.
http://www.aopen.com.tw/tech/faq/default.htm

4 **Download Software:** Check out this table to get the latest updated BIOS/utility and drivers.
http://www.aopen.com.tw/tech/download/default.htm

5 **News Group:** Your problem probably had been answered by our support engineer or professional users on the news group.
http://www.aopen.com.tw/tech/newsgrp/default.htm

6 **Contact Distributors/Resellers:** We sell our products through resellers and integrators. They should know your system configuration very well and should be able to solve your problem more efficiently than us. After all, their attitude of service is an important reference for you if next time you want to buy something else from them.

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Contact Us: Please prepare detail system configuration and error symptom before contacting us. The **part number**, **serial number** and **BIOS version** are also very helpful.

Part Number and Serial Number

The Part Number and Serial number are printed on bar code label. You can find this bar code label on the outside packing, on ISA/CPU slot or on component side of PCB. For example:
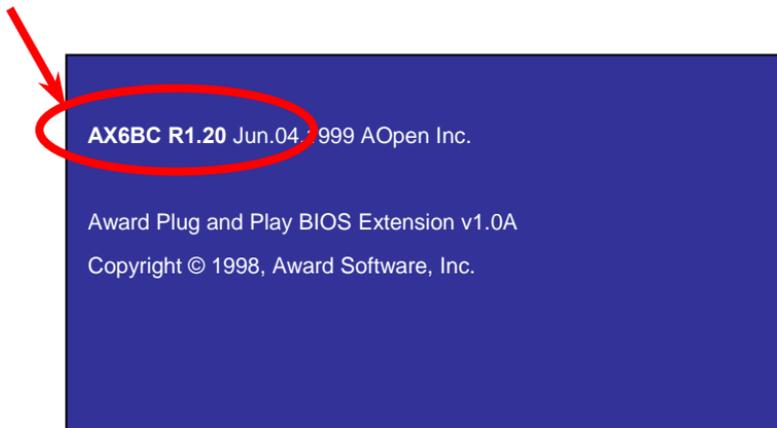

P/N:91.88110.201   S/N:91949378KN73
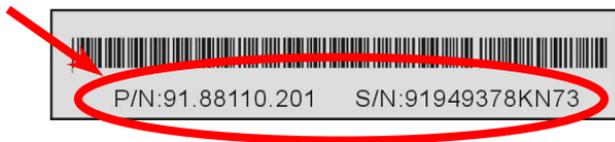
P/N: 91.88110.201 is part number, **S/N: 91949378KN73** is serial number

Model name and BIOS version

Model name and BIOS version can be found on upper left corner of first boot screen ([POST](#) screen).
For example:

AX6BC R1.20 Jun.04. 999 AOpen Inc.

Award Plug and Play BIOS Extension v1.0A

Copyright © 1998, Award Software, Inc.

AX6BC is model name of motherboard, **R1.20** is BIOS version.

Web :   http://www.aopen.com/

Email : Send us email by going through the contact form below.

    English   http://www.aopen.com.tw/tech/contact/techusa.htm

    Japanese http://aojp.aopen.com.tw/tech/contact/techjp.htm

    Chinese   http://w3.aopen.com.tw/tech/contact/techtw.htm

TEL:

    USA   650-827-9688

    Netherlands   +31 73-645-9516

    China   (86) 755-375-3013

    Taiwan   (886) 2-2696-1333

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